

United States  
Department of  
Agriculture

Soil  
Conservation  
Service

In cooperation with  
Illinois Agricultural  
Experiment Station

# Soil Survey of Ford County, Illinois





# How To Use This Soil Survey

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## General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the

use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units**

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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in February 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Ford County Soil and Water Conservation District. The cost was shared by the Ford County Board.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 128.

**Cover:** A system of grassed, parallel tile outlet terraces on Elliott soils. Terraces and a conservation tillage system help to control erosion on these soils.



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# Foreword

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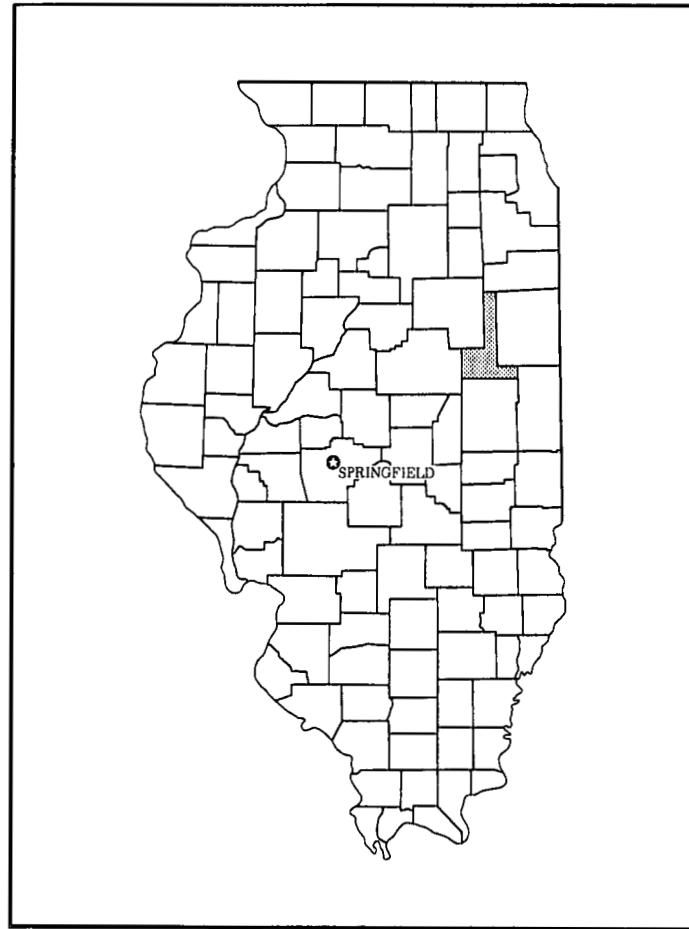
This soil survey contains information that can be used in land-planning programs in Ford County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes  
State Conservationist  
Soil Conservation Service



Location of Ford County in Illinois.

# Soil Survey of Ford County, Illinois

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By Donald J. Fehrenbacher, Soil Conservation Service

Fieldwork by Donald J. Fehrenbacher, Bruce R. Putman, and William M. Teater,  
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United States Department of Agriculture, Soil Conservation Service,  
in cooperation with  
Illinois Agricultural Experiment Station

FORD COUNTY is in the east-central part of Illinois. It has an area of 312,320 acres, or about 490 square miles. It is bordered on the south by Champaign County, on the west by Livingston and McLean Counties, on the north by Kankakee, Livingston, and Iroquois Counties, and on the east by Iroquois and Vermilion Counties. In 1980, the population was 15,265 (5). Paxton is the county seat.

This soil survey supersedes the soil survey of Ford County published in 1941 (7). It provides additional information and more recent interpretations and contains larger maps that show the soils in greater detail.

## General Nature of the County

This section provides general information about the climate, history and development, transportation facilities, and relief, physiography, and drainage in Ford County.

### Climate

Prepared by the Illinois State Water Survey, Champaign, Illinois.

Ford County is cold in winter and hot in summer. Winter precipitation, frequently snow, results in a good accumulation of soil moisture by spring and minimizes drought in summer on most soils. The normal annual precipitation is adequate for all crops that are suited to

the temperature and length of the growing season in the county.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Kankakee in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In January the average temperature is 22.5 degrees F, and the average January minimum temperature is 14.2 degrees. The lowest temperature on record, which occurred at Kankakee on January 28, 1963, is 21 degrees. In summer the average temperature is 72.5 degrees, and the average monthly maximum temperature is 83.9 degrees. The highest recorded temperature, which occurred at Kankakee on July 20, 1953, is 101 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 35 inches. Of this, about 23 inches, or 65 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The

heaviest 1-day rainfall during the period of record was

area, and (3) Pennsylvanian sandstone north of

8.43 inches at Kankakee on July 13, 1957.

Roberts.

relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state

areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses

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# General Soil Map Units

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The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

## Soil Descriptions

### Nearly Level and Gently Sloping Soils That Have Very Slow or Slow Permeability; on Till Plains and Moraines

The major management needs on these soils are a surface drainage system, an adequate moisture supply, and erosion control.

#### 1. Rowe-Clarence Association

*Poorly drained and somewhat poorly drained, silty and clayey soils formed in a thin layer of loess or local wash and in the underlying glacial till*

This association consists of Rowe soils in broad, nearly level and depressional, low areas and Clarence soils in narrow, nearly level and gently sloping, high areas and on some of the steeper side slopes. The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

county. It is about 47 percent Rowe soils, 37 percent Clarence soils, and 16 percent minor soils.

Rowe soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 14 inches thick. The subsurface layer is black, mottled, friable silty clay about 6 inches thick. The subsoil is about 32 inches thick. It is olive gray, mottled, firm silty clay. It is calcareous in the lower part. The substratum to a depth of 60 inches is olive gray, mottled, very firm, calcareous silty clay.

Clarence soils are somewhat poorly drained. Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsoil is mottled silty clay about 23 inches thick. The upper part is olive brown and firm; the next part is light olive brown, firm, and calcareous; and the lower part is olive brown, very firm, and calcareous. The substratum to a depth of 60 inches is olive brown, mottled, very firm, calcareous silty clay.

The minor soils in this association are Chatsworth, Rantoul, and Rutland soils. The moderately well drained Chatsworth soils are on the steeper side slopes. The somewhat poorly drained Rutland soils are in positions similar to those of the Clarence soils. Their subsoil is thicker and has less clay than that of the Clarence soils. The very poorly drained Rantoul soils are in depressions below the major soils.

In most areas this association is used for cultivated crops. It is moderately suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, water erosion, a high content of clay, a moderate or low available water capacity, and a high bulk density in the subsoil. Subsurface drains do not function well because of the very slow permeability. A surface drainage system generally is needed.

Mainly because of the seasonal high water table, ponding, and very slow permeability, the major soils in this association are poorly suited to use as sites for

This association makes up about 8 percent of the

dwellings and septic tank absorption fields.

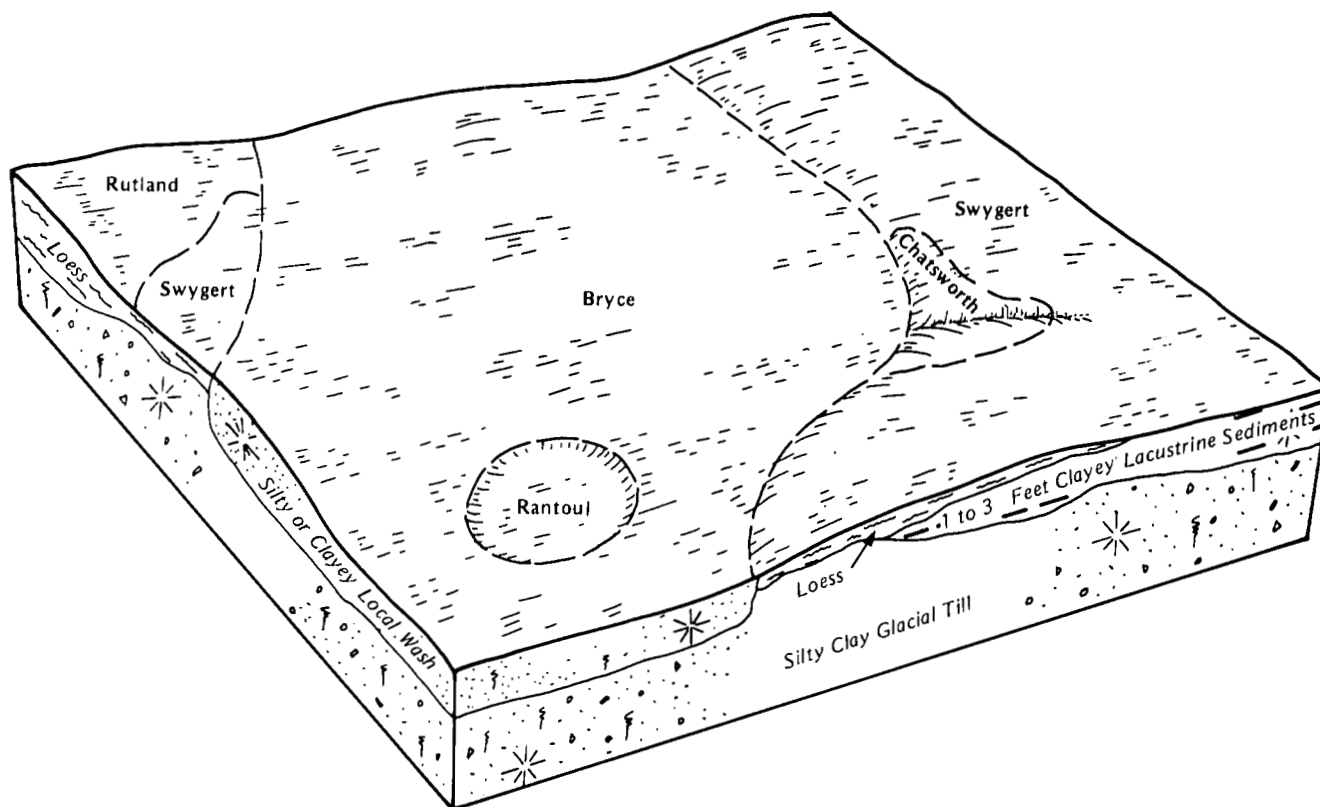


Figure 1.—Typical pattern of soils and parent material in the Bryce-Swygert association.

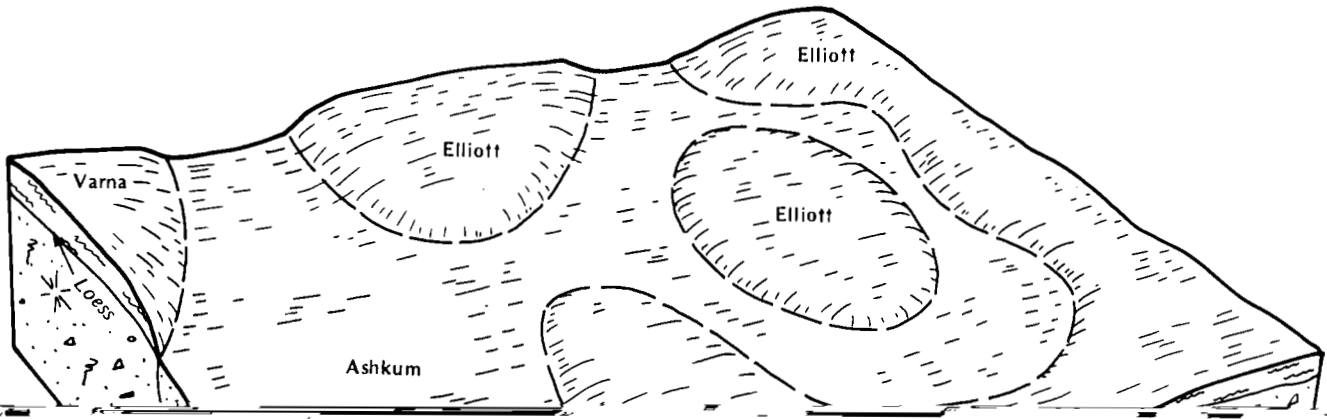
## 2. Bryce-Swygert Association

*Poorly drained and somewhat poorly drained, silty soils formed in loess and lacustrine sediments or local wash and in the underlying glacial till*

This association consists of Bryce soils in broad, nearly level, low areas and Swygert soils in broad, nearly level and gently sloping, high areas. The difference in elevation between the high and low areas

very firm, calcareous silty clay.

Swygert soils are somewhat poorly drained. Typically, the surface layer is black, friable silty clay loam about 13 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is light olive brown, mottled, firm silty clay about 30 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches is light olive brown, mottled, firm, calcareous silty clay.



calcareous silty clay loam. The substratum to a depth of 60 inches is light olive brown, mottled, firm, calcareous silty clay loam.

Ashkum soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam; the next part is gray, firm silty clay; and the lower part is gray, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is gray, mottled, firm, calcareous silty clay loam.

The minor soils in this association are Peotone and Varna soils. The very poorly drained Peotone soils are

Morley soils are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 32 inches thick. The upper part is brown, friable silt loam and firm silty clay loam; the next part is olive brown, mottled, firm silty clay; and the lower part is olive brown, mottled, firm silty clay loam. The substratum to a depth of 60 inches or more is mottled light olive brown, light olive gray, and olive brown, firm, calcareous silty clay loam.

The minor soils in this association are Ashkum, Camden, Chatsworth, Del Rey, and Sawmill soils. The poorly drained Ashkum soils have a darker surface layer and are in lower positions than those of the major soils. The well drained Camden soils have more sand

in depressions below the major soils. The moderately well drained Varna soils are in slightly higher positions than those of the Elliott soils.

In most areas this association is used for cultivated crops. It is well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, the erosion hazard, and moderately slow or slow permeability. A drainage system generally is needed. Subsurface drains function well in most areas.

Mainly because of the seasonal high water table, ponding, and moderately slow or slow permeability, the major soils are poorly suited to use as sites for dwellings and septic tank absorption fields.

#### 4. Blount-Morley Association

*Somewhat poorly drained and moderately well drained, silty soils formed in loess and in the underlying glacial till*

This association consists of Blount soils in narrow, nearly level, low areas and Morley soils in narrow, gently sloping, high areas and on some of the steeper side slopes. The difference in elevation between the low and high areas ranges from about 5 to 30 feet.

This association makes up less than 1 percent of the county. It is about 67 percent Blount soils, 23 percent

and less clay in the lower part than the Morley soils.

They are in positions similar to those of the Morley soils. The moderately well drained Chatsworth soils are in more sloping positions than those of the major soils. The somewhat poorly drained Del Rey soils do not have clayey glacial till within a depth of 60 inches and are in positions similar to those of the Blount soils. The poorly drained Sawmill soils are subject to flooding and are in lower positions than those of the major soils.

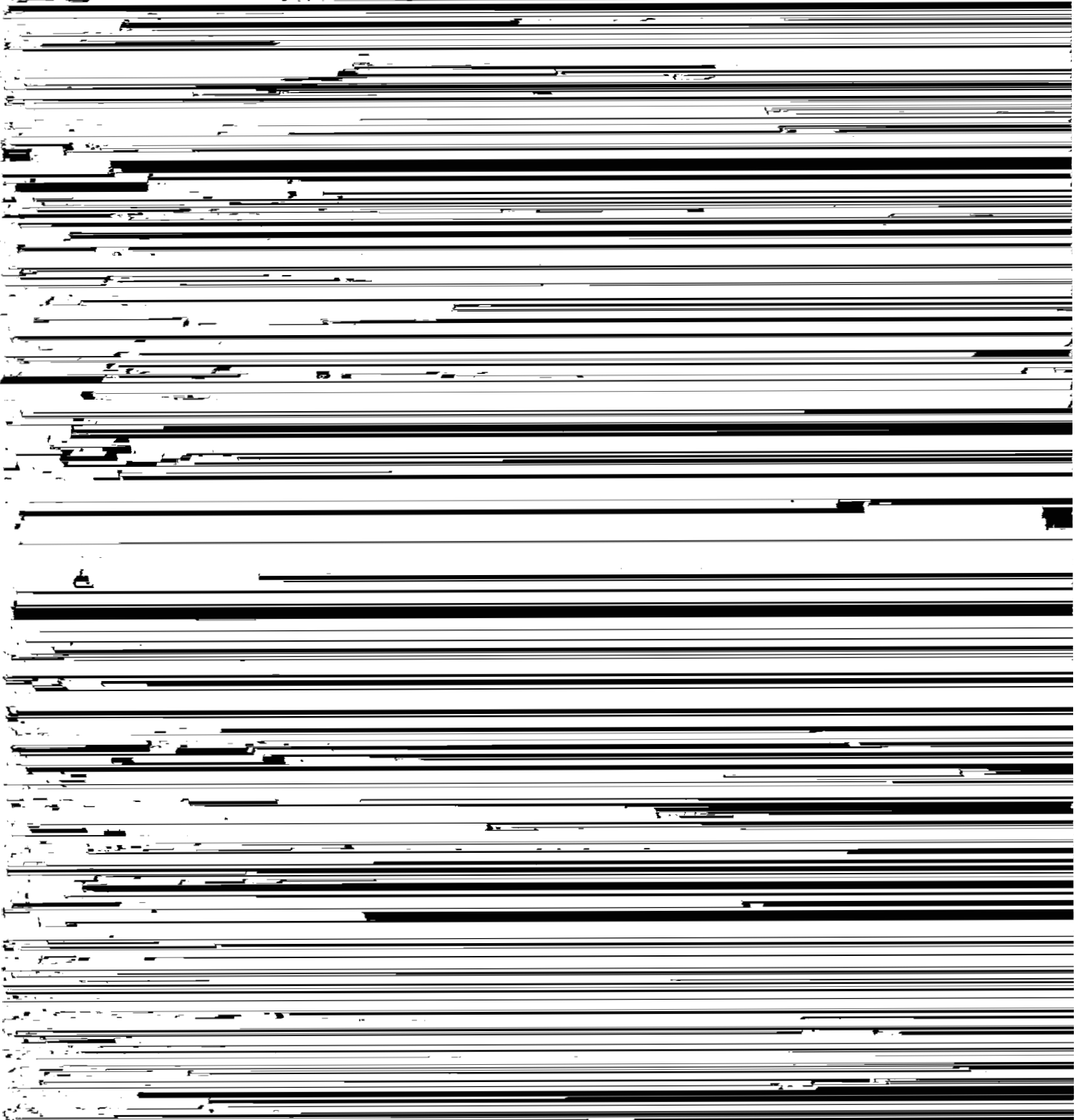
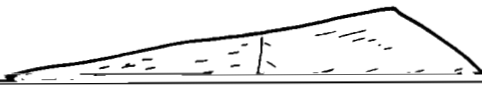
In most areas the major soils in this association are used for cultivated crops. They are well suited to the crops commonly grown in the county. The major management concerns are the seasonal high water table, the erosion hazard, and moderately slow or slow permeability. A drainage system is generally needed in the Blount soils. Subsurface drains function well in most areas.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields because of the moderately slow and slow permeability and the seasonal high water table.

#### 5. Milford-Martinton-Del Rey Association

*Poorly drained and somewhat poorly drained, silty soils formed in lacustrine sediments*

This association consists of Milford, Martinton, and Del Rey soils.



Mainly because of the seasonal high water table, ponding, and moderately slow and slow permeability, the major soils are poorly suited to use as sites for dwellings and septic tank absorption fields.

**Nearly Level and Gently Sloping Soils That Have Moderate or Moderately Slow Permeability; on Till Plains and Moraines**

The major management needs in areas of these soils are surface and subsurface drainage systems and erosion control.

**6. Drummer-Dana-Raub Association**

calcareous silt loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam.

The minor soils in this association are Corwin and Peotone soils. The moderately well drained Corwin soils are in more sloping positions than those of the major soils. The very poorly drained Peotone soils are in depressions below the major soils.

In most areas the major soils in this association are used for cultivated crops. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, and the erosion hazard. In most

areas of the Drummer and Dana soils, a drainage

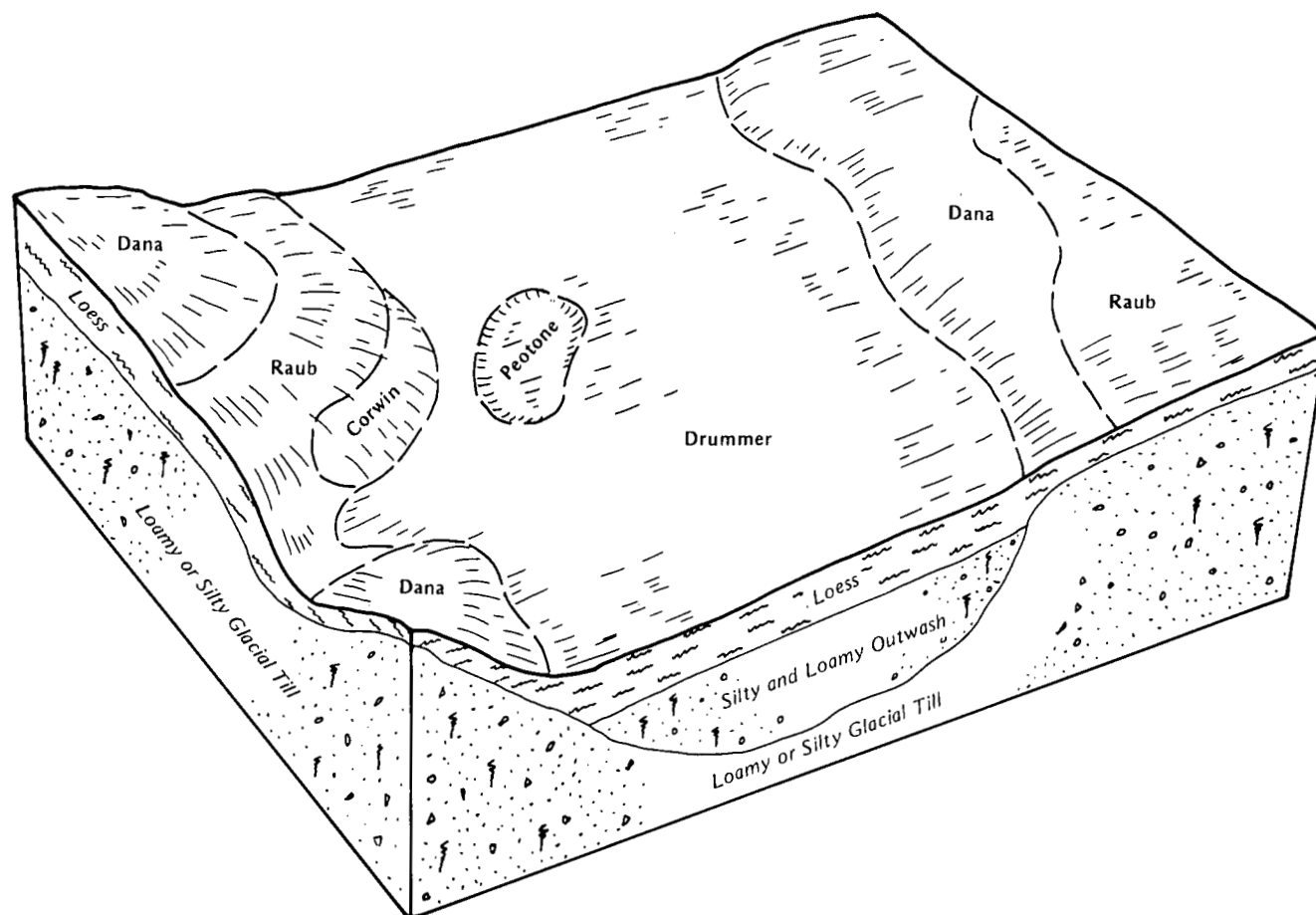


Figure 4.—Typical pattern of soils and parent material in the Drummer-Dana-Raub association.

subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is mottled, firm silty clay loam about 36 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous, stratified silt loam, loam, and silty clay loam.

The minor soils in this association are La Hogue and Selma soils. The somewhat poorly drained La Hogue soils are in higher positions than those of the Pella soils. The poorly drained Selma soils are in positions similar to those of the Pella soils. They are sandier in the subsoil than the Pella soils.

In most areas the major soils of this association are used for cultivated crops. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table and ponding in areas of both the major soils

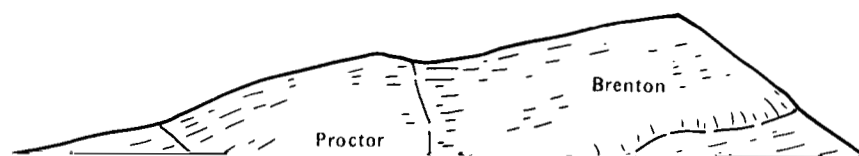
and the moderately slow permeability in the Milford soils. A drainage system generally is needed. Subsurface drains work well.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields. The seasonal high water table and ponding in areas of both the major soils and the moderately slow permeability in the Milford soils are the major limitations.

## 8. Drummer-Brenton Association

*Poorly drained and somewhat poorly drained, silty soils formed in loess and in the underlying glacial outwash*

This association consists of Drummer soils in very broad, nearly level, low areas and Brenton soils in broad, nearly level, slightly higher areas. The difference in elevation between the low and high areas ranges from about 3 to 30 feet.



**Nearly Level and Gently Sloping Soils That Have Moderate Permeability in the Subsoil and Moderately Rapid or Rapid Permeability in the Substratum; on Outwash Ridges**

The major management needs on these soils are surface and subsurface drainage systems and erosion control.

**9. Selma-Ridgeville-Onarga Association**

*Poorly drained, somewhat poorly drained, and well drained, loamy soils formed in glacial outwash*

This association consists of Selma soils in broad, nearly level, low areas and Ridgeville and Onarga soils in narrow and very narrow, nearly level and gently sloping, higher areas. The difference in elevation between the low and high areas ranges from about 3 to 20 feet.

This association makes up less than 1 percent of the county. It is about 71 percent Selma soils, 15 percent Ridgeville soils, 9 percent Onarga soils, and 5 percent minor soils.

Selma soils are poorly drained. Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is black and very dark gray, friable loam about 13 inches thick. The subsoil is about 25 inches thick. It is mottled and firm. The upper part is grayish brown clay loam, and the lower part is gray, grayish brown, and light olive brown loam. The substratum to a depth of 60 inches or more is mottled gray, grayish brown, and light olive brown, friable, stratified sandy loam and loam.

Pella soils. The poorly drained Milford soils are in slightly lower positions than those of the Selma soils. Also, they have more clay in the subsoil. The poorly drained Pella soils have less sand in the subsoil than the Selma soils. They are in positions similar to those of the Selma soils.

In most areas the major soils in this association are used for cultivated crops or pasture. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, moderate available water capacity, and the hazards of erosion and soil blowing. A drainage system generally is needed in areas of the Selma and Ridgeville soils. Subsurface drains work well.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields. The main limitations are the seasonal high water table, ponding, and moderately rapid or rapid permeability in the substratum.

**Nearly Level Soils That Have Moderate or Slow Permeability; on Flood Plains**

These soils are subject to frequent flooding. The major management needs are surface and subsurface drainage systems and protection from flooding.

**10. Sawmill-Zook Association**

*Poorly drained, silty soils formed in alluvium*

This association consists of broad to narrow, nearly level, low areas. The difference in elevation between

poorly drained Blount and well drained Camden soils. These soils are in positions higher than those of the major soils and are not subject to flooding.

In most areas the major soils of this association are used for cultivated crops. If protected from flooding, the soils generally are well suited to the cultivated crops commonly grown in the county. The major management concerns are flooding and the seasonal high water table. Slow permeability is an additional concern in the Zook soils. A drainage system generally is needed.

The major soils are unsuited to use as sites for dwellings and septic tank absorption fields. The main limitations are flooding and the seasonal high water table in areas of both the major soils and the slow permeability in the Zook soils.

## **Broad Land Use Considerations**

The soils in Ford County vary widely in their suitability for major land uses. Most of the acreage is used for cultivated crops, primarily corn and soybeans. The major soils in the associations generally are well suited to cultivated crops. The main management concerns are the erosion hazard, the seasonal high water table, and ponding. Sawmill and Zook soils are frequently flooded mainly in winter and early in spring. The floodwater causes slight or moderate crop damage. A low or moderate available water capacity is a limitation in the Rowe-Clarence association.

A small acreage in the county is used for pasture. All associations are suitable for grasses and legumes. A low or moderate available water capacity is the main limitation in the Rowe-Clarence association.

Only small areas in the county are used as woodland. They are mostly adjacent to creeks and

streams. The soils in these areas generally are suited to woodland.

Some small areas in the county have been developed or built up for urban uses. Most of the major soils in the associations are poorly suited to building site development. The seasonal high water table, ponding, low strength, the shrink-swell potential, and frost action are the main management concerns. In addition, the Onarga soils in association 9 are poorly suited to onsite waste disposal because of a poor filtering capacity. The rapid movement of effluent through these soils may result in the pollution of ground water. Generally, each association has small areas of minor soils that are well suited or moderately suited to building site development.

The suitability of the associations for recreational development ranges from well suited to unsuited. The suitability depends partly on the intensity of the expected use. The Dana soils in association 6 and the Onarga soils in association 9 are well suited to intensive recreational uses. All the other major soils in the associations generally are unsuited to recreational development. The seasonal high water table is the main limitation. Flooding is an additional limitation in areas of the Sawmill-Zook association. At least some small areas of minor soils that are suited to recreational development generally are nearby.

The major soils in the associations generally are moderately suited to habitat for wildlife. Swygert, Elliott, Dana, Brenton, and Ridgeville soils are well suited to habitat for openland and woodland wildlife. Martinton, Del Rey, and Clarence soils are well suited to habitat for woodland wildlife. Rowe, Bryce, Ashkum, Milford, Sawmill, and Zook soils are well suited to habitat for wetland wildlife. Drummer and Pella soils are well suited to habitat for openland and wetland wildlife.

# Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit

areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

## Soil Descriptions

general facts about the soil and gives the principal hazards and limitations to be considered in planning for

**23A—Blount silt loam, 0 to 3 percent slopes.** This nearly level, somewhat poorly drained soil is on rises on

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Surface and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where slopes are long and more than 2 percent. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

Plants grazed by livestock or harvested for hay grow well on this soil. Deferred grazing when the soil is wet helps to prevent surface compaction, excessive runoff, and poor tilth. Either a combination of subsurface tile and surface inlets or a shallow surface drainage system helps to drain low spots. Unmowed strips, 30 to 50 feet wide, at the edge of hayland provide excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations helps to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing subsurface drains helps to lower the water table. Enlarging the absorption field or replacing the soil with more permeable material helps to overcome the slow permeability.

The land capability classification is IIw.

**56B—Dana silt loam, 1 to 5 percent slopes.** This gently sloping, moderately well drained soil is on ridges on till plains and moraines. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 47 inches thick. It is mottled. The upper part is brown, friable silt loam; the next part is dark yellowish brown, firm silty clay loam; and the lower part is olive brown, firm clay loam and silt loam. The substratum to a depth of 60 inches or more is olive

areas erosion has thinned the surface layer. In other areas depth to the seasonal high water table is less than 3 feet.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and is poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on

sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIe.

**67—Harpster silty clay loam.** This nearly level, poorly drained soil is in low areas on outwash plains and lake plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is black, friable, calcareous silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable, calcareous silty clay loam about 9 inches thick. The subsoil is silty clay loam about 23 inches thick. It is calcareous, firm, and mottled. The upper part is dark grayish brown; the next part is dark gray; and the lower part is mottled, olive brown, olive yellow, and gray. The substratum to a

brown, friable, calcareous loam and silt loam. In some areas the surface layer does not have carbonates. In other areas the subsoil has more clay.

Included with this soil in mapping are small areas of the very poorly drained Peotone soils. These soils have more clay in the subsoil than the Harpster soils. They are ponded for long periods and are in depressions below the Harpster soil. They make up 1 to 8 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below. Available water capacity is very high. Organic matter content is high. The surface layer is friable, but it becomes compact and cloddy if it has been plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous, stratified silt loam, loam, silt, and silty clay loam. In some areas depth to the seasonal high water table is more than 2 feet. In other areas the subsoil has either more clay or less clay.

Included with this soil in mapping are small areas of the very poorly drained Peotone soils, which are ponded for long periods. These soils are in depressions below the Milford soil. They make up 2 to 10 percent of the unit.

Water and air move through the Milford soil at a moderately slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is high. Organic matter content also is high. The surface layer is friable but becomes compact and cloddy if it has been plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. This

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Applications of lime are not needed. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table with surface and subsurface

moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains function satisfactorily if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding

Typically, the surface layer is black, friable silty clay loam about 13 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is light olive brown, mottled, firm silty clay about 30 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the slope is more than 2 percent. In places the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in slightly lower positions than those of the Swygert soil. They make up 2 to 10 percent of the unit.

Water and air move through the subsoil of the Swygert soil at a slow rate and through the substratum at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

drained soil is on side slopes on till plains and moraines. Individual areas are irregular in shape and range from 3 to 150 acres in size.

Typically, the surface layer is mixed very dark gray and very dark grayish brown, friable silty clay loam. It has been eroded to a thickness of about 6 inches. The subsoil is mottled, firm silty clay about 31 inches thick. The upper part is yellowish brown, and the lower part is light olive brown and calcareous. The substratum to a depth of 60 inches or more is light gray, light olive brown, and yellowish brown, firm, calcareous silty clay. In some areas the surface layer is thicker and darker. In other areas the subsoil is thicker.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in slightly lower positions than those of the Swygert soil. They make up 2 to 9 percent of the unit.

Water and air move through the upper part of the Swygert soil at a slow rate and through the lower part at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is low. Organic matter content is moderate. The surface layer is compact and cloddy if it has been plowed when too wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and very slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is 1Ie.

**102—La Hogue loam.** This nearly level, somewhat poorly drained soil is on rises on outwash plains and lake plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable loam about 13 inches thick. The subsurface layer is very dark brown, friable loam about 3 inches thick. The subsoil is about 32 inches thick. It is friable and mottled. The upper part is brown clay loam, the next part is olive brown clay loam and sandy loam, and the lower part is light olive brown sandy loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, friable sandy loam. In some areas the surface layer is thinner and lighter in color as a result of erosion.

Included with this soil in mapping are small areas of the poorly drained Drummer, Pella, and Selma soils and the well drained Jasper soils. Drummer, Pella, and Selma soils are in slightly lower positions than those of the La Hogue soil. Jasper soils are in higher positions than those of the La Hogue soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the La Hogue soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. In some years the seasonal high water table delays planting. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations lowers the water table. Reinforcing

foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains lowers the water table.

The land capability classification is 1.

**103—Houghton muck.** This nearly level, very poorly drained soil is in depressions. It is ponded for long periods in spring. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is black, highly decomposed muck about 12 inches thick. The underlying material to a depth of 60 inches is very dark gray and very dark grayish brown muck. In some areas the decomposed organic material is not so thick. In other areas the surface layer is silt loam.

Included with this soil in mapping are small areas of soils that are ponded during most of the year. Also included are areas of drained soils used for cultivated crops. Included areas make up 2 to 15 percent of the unit.

Water and air move through the Houghton soil at a moderately slow to moderately rapid rate. Surface runoff is very slow or ponded. The seasonal high water table ranges from 1 foot above the surface to 1 foot below. Available water capacity is very high. Organic matter content also is very high. The potential for frost action is high. The soil is very unstable. It is highly compressible when subjected to heavy loads and is subject to subsidence when drained.

Most areas are undrained and uncultivated. A few small areas are drained. This soil is well suited to habitat for wetland wildlife. It generally is unsuited to cultivated crops, hay, and pasture because of the ponding. It is poorly suited to habitat for openland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of ponding and subsidence.

Areas of this soil provide good habitat for wetland wildlife. The soil naturally supports wetland plants, and shallow water areas are available.

The land capability classification is Vw.

**107—Sawmill silty clay loam.** This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods. Individual areas are irregular in shape and range from 50 to more than 2,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The

subsoil is silty clay loam about 34 inches thick. The upper part is very dark gray and friable. The lower part is dark grayish brown, mottled, and friable and firm. The substratum to a depth of 60 inches or more is dark grayish brown, mottled, firm silty clay loam. In some areas the subsoil is darker throughout. In other areas the soil has more clay throughout. In places the subsoil has more sand.

Water and air move through this soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet. Available water capacity is high. Organic matter content also is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately well suited to habitat for wetland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the flooding.

If this soil is used for the crops commonly grown in

friable, stratified sandy loam and loam. In some areas the surface layer and subsoil have less sand. In other areas depth to the seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the well drained Jasper soils. These soils are subject to water erosion and are in higher positions than those of the Selma soil. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Selma soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in

and brown, friable, stratified sandy loam and gravelly sandy loam. In some areas the surface layer is darker. In other areas the subsoil has more clay.

Included with this soil in mapping are small areas of the poorly drained Drummer and Milford soils. These soils are in lower positions than those of the Camden soil. They make up 1 to 5 percent of the unit.

Water and air move through the Camden soil at a moderate rate. In cultivated areas surface runoff is slow. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable, but it tends to crust after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, to use as a site for dwellings with basements, and to use as a site for septic tank absorption fields. It is moderately well suited to use as a site for dwellings without basements.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Erosion is a hazard in areas where slopes are very long. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

Pasture plants and hay grow well on this soil.

and silty clay loam; and the lower part is light olive brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In some areas the surface is thinner and lighter in color because of erosion. In other areas depth to the seasonal high water table is more than 3 feet. In places the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in slightly lower positions than those of the Elliott soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Elliott soil at a moderately slow rate and through the lower part at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Installing a drainage system helps to lower the water table and to improve productivity. Surface drains and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where the slopes are very long. A conservation tillage system that leaves

Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown, friable silt loam about 6 inches thick. It has been mixed with the upper part of the subsoil during cultivation. The subsoil is light olive brown, mottled, firm silty clay loam about 20 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches or more is mottled light olive brown, light gray, and light olive gray, firm, calcareous silty clay loam. In some areas the surface layer is thicker and darker. In other areas depth to the seasonal high water table is more than 3 feet. In places the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils and the moderately well drained Chatsworth soils. Ashkum soils are in slightly lower positions than those of the Elliott soil.

drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIe.

**147A—Clarence silty clay loam, 0 to 2 percent slopes.** This nearly level, somewhat poorly drained soil is on rises on till plains and moraines. Individual areas are irregular in shape and range from 3 to 90 acres in size.

Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsoil is mottled silty clay about 23 inches thick. The upper part is olive brown and firm; the next part is light olive brown, firm, and calcareous; and the lower part is olive brown, very firm, and calcareous. The substratum to a depth of 60 inches or more is olive brown, mottled, very firm, calcareous silty clay. In some areas the surface layer is

Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the

suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grains, further erosion is a hazard. Also, the low

[Redacted content]

soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Proctor soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, and to use as a site for septic tank absorption fields. It is moderately well suited to use as a site for dwellings.

In areas of this soil used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is 1Ie.

**149—Brenton silt loam:** This nearly level, somewhat poorly drained soil is on rises on outwash plains. Individual areas are irregular in shape and range from 3 to 180 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 14 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is brown, firm silty clay loam; the next part is yellowish brown, friable silt loam; and the lower part is yellowish brown, friable, stratified clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is mottled yellowish brown and light brownish gray, friable, calcareous, stratified sandy loam and gravelly sandy loam. In some areas the upper part of the subsoil has more sand.

Included with this soil in mapping are small areas of

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. In some years the seasonal high water table delays planting. Subsurface tile drains work well if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains lowers the water table.

The land capability classification is 1.

**150B—Onarga fine sandy loam, 1 to 5 percent slopes.** This gently sloping, well drained soil is on outwash ridges. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark brown, friable fine sandy loam about 10 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable fine sandy loam. The next part is yellowish brown, very friable fine sandy loam. The lower part is yellowish brown, very friable loamy fine sand. The substratum to a depth of 60 inches or more is yellowish brown, mottled, loose loamy fine sand. In some areas the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Drummer, Pella, and Selma and somewhat poorly drained La Hogue and Ridgeville soils. These soils are in lower positions than those of the Onarga soil. They make up 2 to 10 percent of the unit.

In areas of this soil used for corn, soybeans, or small grain, erosion and soil blowing are hazards. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation.

the water table is not too close

foundations helps to prevent the structural damage

fields, the ponding is a hazard. Installing surface and

If this soil is used as a site for septic tank absorption

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Installing subsurface drains lowers the water table. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIw.

**192—Del Rey silt loam.** This nearly level, somewhat poorly drained soil is on slightly convex rises on lake plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, friable silt loam about 6 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is dark yellowish brown, friable

control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIw.

**194B—Morley silt loam, 1 to 5 percent slopes.** This gently sloping, moderately well drained soil is on ridges or till plains. Individual areas are somewhat irregular in shape and

In areas of this soil used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

In the areas used for pasture, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion. Leaving unmowed strips, 30 to 50 feet wide, at the edge of hayland provides excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIe.

**223B2—Varna silt loam, 1 to 5 percent slopes, eroded.** This gently sloping, moderately well drained

the somewhat poorly drained Elliott soils. These soils are in slightly lower positions than those of the Varna soil. They make up 2 to 10 percent of the unit.

Water and air move through the Varna soil at a slow or moderately slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately well suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow or slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Installing both surface and subsurface drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

the seasonal high water table is more than 1 foot. In places the subsoil is dark to a depth of more than 24 inches.

Included with this soil in mapping are small areas of the very poorly drained Rantoul soils. These soils are

inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam. The next part is gray, firm silty clay. The lower part is gray, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is gray,

the Rowe soil. They make up 2 to 10 percent of the

depth to the seasonal high water table is more than 2

thick. The upper part is dark grayish brown and firm. The next part is gray and firm. The lower part is gray and very firm. The substratum to a depth of 60 inches or more is gray, mottled, very firm, calcareous silty clay. In some areas, the subsoil is thicker and the soil is deeper to calcareous silty clay. In other areas depth to the seasonal high water table is more than 1 foot.

Included with this soil in mapping are small areas of the very poorly drained Rantoul soils. These soils are ponded for long periods and are in depressions below the Bryce soil. They make up 2 to 10 percent of the unit.

Water and air move through the Bryce soil at a slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 1 foot above the surface to 1 foot below. Available water capacity is moderate. Organic matter content is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard and the slow permeability is a limitation. Installing surface and subsurface drains helps to lower the seasonal high

Typically, the surface layer is black, friable silty clay about 8 inches thick. The subsurface layer is black, firm silty clay about 5 inches thick. The subsoil is firm, mottled silty clay about 35 inches thick. The upper part is black, and the lower part is olive yellow, yellowish brown, and light olive gray. The substratum to a depth of 60 inches or more is mottled gray, yellowish brown, and light olive gray, firm, calcareous silty clay. In some areas the surface layer is thinner. In other areas the subsoil has less clay.

Water and air move through this soil at a very slow rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is moderate. Organic matter content is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential is high, and the potential for frost action is moderate.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, hay, and pasture. It is well suited to habitat for openland and wetland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the ponding.

In areas of this soil used for corn, soybeans, or small grain, the ponding and the seasonal high water table delay planting, damage crops, and reduce productivity. Surface drains and ditches help to remove excess surface water. Minimizing tillage and returning crop residue to the soil improve soil tilth.

The land capability classification is IIIw.

**241C—Chatsworth silty clay, 4 to 10 percent slopes.** This moderately sloping, moderately well drained soil is on severely eroded side slopes on till plains and moraines. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark grayish brown, firm, calcareous silty clay about 5 inches thick. The subsoil is olive, mottled, calcareous silty clay about 13



Figure 6.—A severely eroded area of Chatsworth silty clay, 4 to 10 percent slopes, on a knob.

Tilth is poor in the surface layer. This layer is compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is generally unsuited to cultivated crops because of a severe erosion hazard (fig. 6). It is poorly suited to hay and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

Establishing hay or pasture plants on this soil helps to keep erosion within tolerable limits. Deferred grazing helps to prevent surface compaction and excessive runoff. Tilling on the contour when a seedbed is prepared helps to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the very slow permeability is a limitation. Replacing the soil with more permeable fill improves

the absorption of liquid waste.

The land capability classification is VIe.

#### **294B—Symerton silt loam, 1 to 5 percent slopes.**

This gently sloping, moderately well drained soil is on ridges on till plains and moraines. Individual areas are irregular in shape and range from 3 to 10 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 26 inches thick. The upper part is brown, friable gravelly clay loam. The next part is dark yellowish brown and brown, mottled, friable gravelly clay loam. The lower part is olive, mottled, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is olive, mottled, very firm, calcareous silty clay loam. In some areas the surface layer is lighter in color because of erosion. In other areas the upper part of the subsoil has more clay and less sand.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff

is medium. The seasonal high water table is at a depth of 3.5 to 6.0 feet. Available water capacity and organic matter content are moderate. The shrink-swell potential

and the potential for frost action also are moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage

below. Available water capacity is high. Organic matter content also is high. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet.

The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops and to habitat for wetland wildlife. It is moderately well suited to hay and pasture and poorly suited to habitat for openland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the ponding.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

The land capability classification is 1lw.

around foundations lowers the water table.

If this soil is used as a site for septic tank absorption

This gently sloping, somewhat poorly drained soil is on

flats or alluvial and moraine deposits.

to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to

Minimizing tillage and returning crop residue to the soil improve tilth.

If this soil is used for pasture and hay, the flooding is a hazard and the seasonal high water table is a limitation. Constructing dikes and diversions helps to control the flooding, and installing subsurface drains lowers the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw

prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIe.

**405—Zook silty clay loam:** This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods. Individual areas are irregular in shape and range from 15 to several hundred acres in size.

Typically, the surface soil is black, friable silty clay loam about 25 inches thick. The subsoil is mottled, firm silty clay about 25 inches thick. The upper part is black, and the lower part is dark gray. The substratum to a depth of 60 inches or more is dark gray, firm, calcareous silty clay. In some areas the surface soil is thinner. In other areas the subsoil has less clay. In places the surface soil has more clay.

Water and air move through this soil at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The surface soil is friable, but it is compact and cloddy if it has been plowed when wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops. It is moderately suited to hay and pasture and to habitat for openland wildlife.

**440B—Jasper loam, 1 to 5 percent slopes.** This gently sloping, well drained soil is on ridges on outwash plains and lake plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil is very dark brown, friable loam about 20 inches thick. The subsoil is about 32 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The next part is sandy loam. The lower part is stratified loam and clay loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, friable, stratified loam and silt loam. In some areas the surface soil is thinner. In other areas the subsoil has less sand and more silt.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue and poorly drained Drummer, Pella, and Selma soils. These soils are in lower positions than those of the Jasper soil. They make up 2 to 10 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The potential for frost action also is moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, and to use as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.

irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 6 inches thick. The subsoil is about 29 inches thick. It is mottled. The upper part is yellowish brown, friable silty clay loam. The lower part is light olive brown, friable and firm, calcareous silt loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the upper part of the subsoil has more sand. In places the substratum has more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in depressions below the Raub soil. They make up 2 to 6 percent of the unit.

Water and air move through the Raub soil at a moderately slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, a drainage system is needed to improve productivity. Subsurface drains work well if suitable

**495C3—Corwin clay loam, 5 to 10 percent slopes, severely eroded.** This moderately sloping, moderately well drained soil is on ridges and side slopes in the uplands. In most areas, water erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is mixed dark brown and brown, friable clay loam about 8 inches thick. The subsoil is clay loam about 29 inches thick. It is mottled. The upper part is olive brown and friable. The lower part is light olive brown, firm, and calcareous. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam. In some areas the surface layer is thicker and darker. In other areas the slope is less than 5 percent or more than 10 percent. In places depth to the seasonal high water table is less than 4 feet.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff is rapid. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is poorly suited to cultivated crops and well suited to hay and pasture and to habitat for openland wildlife. It

around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IVe.

**805—Orthents, clayey.** These nearly level to

can be lowered by installing closely spaced underground drains. Adding fertilizer, planting suitable species, increasing mowing heights during the summer, and watering during extended dry periods help to overcome the very low available water capacity. Adding a layer of silty or loamy material improves the capacity for revegetation.

This map unit is not assigned a land capability classification.

**865—Plts, gravel.** This map unit consists of excavations from which gravel and a small amount of sand have been removed. It is generally on outwash plains, stream benches, or kames. The gravel is used

is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 300,000 acres in the survey area, or about 95 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in the southeastern part, mainly in association 1, which is described under the heading "General Soil Map Units." Nearly all of the prime farmland is used for crops. The

crops grown on this land, mainly corn and soybeans, account for most of the county's total agricultural income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify for prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. In Ford County most of the naturally wet soils have been adequately drained.

## Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior

of soils in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map

incorporated into the surface layer by plowing. The result is a decreased rate of water infiltration, cloddiness if the soil is worked when wet, crusting after a hard rain, and an increased amount of stones in the surface layer. Under these conditions, preparing a good seedbed is difficult. Third, uncontrolled erosion allows sediment to enter lakes, ditches, streams, and other waterways. Removing this sediment is expensive, and the resulting pollution can make the water unsuitable for municipal and recreational uses.

Terraces, contour farming, conservation tillage, and crop rotations help to control erosion. They also increase the rate of water infiltration and reduce the runoff rate. Terraces are designed to shorten the length of a slope and are most effective on smooth, long slopes. Contour farming is accomplished by planting crops along the contour of sloping ground, essentially creating a series of miniature terraces.

A conservation tillage system that leaves crop residue on the surface throughout the year, such as no-till or chisel plowing, protects the soil from the impact of raindrops and the subsequent detachment and transportation of soil particles. No-till is most effective

drain wet spots. Moderately permeable and moderately slowly permeable soils can be adequately drained by tile if outlets are available.

Droughtiness limits yields on some of the soils used for crops and pasture. Chatsworth, Clarence, and the eroded Swygert soils, for example, have layers that restrict the penetration of plant roots. Crops grown in these soils are shallow rooted and show moisture stress earlier than crops grown in more permeable soils. Planting drought-tolerant species and reducing the runoff rate minimize droughtiness. A system of conservation tillage that leaves crop residue on the surface after planting reduces the runoff rate.

Soil fertility is naturally high in most soils in the county. Most of the dark soils are neutral in reaction, and most of the light colored soils, which formed under trees, are naturally acid. On most acid soils, applications of agricultural limestone raise the pH level high enough for optimum plant growth. Harpster soils should not be limed because they have accumulated carbonates in the surface layer.

Most of the light colored soils have a naturally low supply of nitrogen. Planting legumes, which take



Figure 7.—This drainage ditch lowers the seasonal high water table by removing excess surface water and by providing outlets for subsurface drains.

records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered (3).

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

### Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and

limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (10). Only class and subclass are used in this survey.

*Capability classes*, the broadest groups, are

## Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils

numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The

does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

*Seedling mortality* refers to the death of naturally occurring or planted tree seedlings, as influenced by the

amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

*Trees to plant* are those that are suitable for commercial wood production.

## Windbreaks and Environmental Plantings

impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for

when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface. Golf fairways are subject to heavy foot traffic and

recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning

some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm

producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, brome grass, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites.

Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet.*

*Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be

in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt

may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer;

were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground

year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. Resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are

sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

## Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features

solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table,

landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil

engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 25 percent silt, and elevated potential for

blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

### Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal

plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

*Sand and gravel* are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as

rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer,

only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water

*Drainage* is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, or to a cemented pan



# Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are

percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway

and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic

determined mainly by converting volume percentage in

the pore space available for water and roots. A bulk

the field to weight percentage.

*Percentage (of soil particles) passing designated*

density of more than 1.6 can restrict water storage and  
root penetration. Moist bulk density is influenced by

texture, kind of clay, content of organic matter, and soil

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

*Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Wind erodibility groups* are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

- 4L. Calcareous, loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that

are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

## Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These

soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly

perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for drainage into the surrounding soil. A

capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed

as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.



# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (11). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic

group. An example is Typic Haplaquolls.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Haplaquolls.

**SERIES.** The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged

## Ashkum Series

The Ashkum series consists of poorly drained, moderately slowly permeable soils on till plains and moraines. These soils formed in silty and clayey local wash and in the underlying silty and clayey glacial till. Slope ranges from 0 to 2 percent.

Ashkum soils are similar to Bryce and Milford soils and commonly are adjacent to Elliott, Peotone, and Varna soils. The somewhat poorly drained Elliott soils and the moderately well drained Varna soils have an argillic horizon and are in higher positions than those of Ashkum soils. Milford soils are stratified in the lower part of the solum. Peotone soils are cumulic and are in depressions below Ashkum soils. Bryce soils have more clay in the control section than Ashkum soils.

Typical pedon of Ashkum silty clay loam, 150 feet north and 1,469 feet west of the southeast corner of sec. 1, T. 24 N., R. 7 E.

Ap—0 to 11 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

AB—11 to 15 inches; very dark grayish brown (2.5Y 3/2) silty clay loam, grayish brown (2.5Y 5/2) dry;

medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine pebbles; slight effervescence; moderately alkaline.

The solum ranges from 31 to 60 inches in thickness. The overlying local wash ranges from 20 to 40 inches in thickness. The mollic epipedon ranges from 10 to 24 inches in thickness.

The Ap horizon has hue of 10YR or is neutral. It has value of 2 or 3 and chroma of 1 or 0. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 2 or less. It is silty clay loam and silty clay. The 2Bg horizon has hue of 2.5Y, 5Y, or 10YR, value of 4 to 6, and chroma of 2 or less. It is silty clay loam or silty clay. The clay content in the control section ranges from 35 to 45 percent. The 2Bg horizon is slightly acid to moderately alkaline. Reaction commonly increases with increasing depth. The 2Cg horizon is mildly alkaline or moderately alkaline.

## Blount Series

The Blount series consists of somewhat poorly drained, slowly permeable soils on till plains and moraines. These soils formed in loess and in the

(10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt2—20 to 27 inches; light olive brown (2.5Y 5/4) silty clay; few fine distinct yellowish brown (10YR 5/4) and distinct light brownish gray (2.5Y 6/2) mottles; moderate fine angular blocky structure; firm; common prominent grayish brown (10YR 5/2) clay films on faces of peds; slightly acid; clear wavy boundary.

2Bt3—27 to 33 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/4) and distinct grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure; firm; common faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear wavy boundary.

2BC—33 to 43 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium prismatic structure; firm; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; strong effervescence; mildly alkaline; clear smooth boundary.

2C—43 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 43 to 48 inches in thickness. The depth to free carbonates ranges from 27 to 40 inches. The clay content in the control section ranges from 35 to 48 percent.

The Ap or A horizon has value of 2 to 4 and chroma of 1 or 2. The E horizon is strongly acid to slightly acid. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 4. It is very strongly acid to neutral. The 2C horizon is mildly alkaline or moderately alkaline.

## Brenton Series

The Brenton series consists of somewhat poorly

Raub soils formed in loess and the underlying glacial till.

Typical pedon of Brenton silt loam, 105 feet north and 825 feet east of the southwest corner of sec. 19, T. 23 N., R. 7 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; medium acid; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; medium acid; clear smooth boundary.

Bt1—14 to 18 inches; brown (10YR 5/3) silty clay loam; few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate fine and medium subangular blocky structure; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 26 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—26 to 34 inches; yellowish brown (10YR 5/4) silt loam; common medium faint yellowish brown (10YR 5/6), many medium prominent gray (5Y 5/1), and common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common distinct grayish brown (10YR 5/2) clay films and common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt wavy boundary.

2Bt4—34 to 48 inches; yellowish brown (10YR 5/4) clay

The solum ranges from 39 to 48 inches in thickness.  
The depth to free carbonates is more than 40 inches.  
The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap and A horizons have value of 2 or 3. The Bt

blocky structure; firm; many distinct dark gray (5Y 4/1) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—24 to 32 inches; dark grayish brown (2.5Y 4/2)

Camden soils are similar to Jasper and Proctor soils and commonly are adjacent to Del Rey, Drummer, Milford, and Sawmill soils. Jasper and Proctor soils have a mollic epipedon. In addition, Jasper soils have more sand in the control section than Camden soils. The somewhat poorly drained Del Rey soils have more clay in the subsoil than Camden soils and are in slightly lower positions. The poorly drained Drummer, Milford, and Sawmill soils are in low areas below Camden soils.

Typical pedon of Camden silt loam, 0 to 3 percent slopes, 890 feet south and 2,305 feet east of the northwest corner of sec. 8, T. 23 N., R. 9 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate very fine and fine granular structure; friable; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

BE—8 to 13 inches; dark brown (10YR 4/3) silt loam; weak fine prismatic structure parting to moderate very fine and fine angular blocky; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—13 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium prismatic structure parting to strong fine and medium angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—20 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium prismatic structure parting to strong medium angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown (10YR 5/3) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common faint dark brown (10YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.

2Bt4—38 to 56 inches; dark yellowish brown (10YR 4/4) clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark brown (10YR 4/3) clay films on faces of peds; about 15 percent gravel in some strata; slightly acid; gradual smooth boundary.

2C—56 to 60 inches; mottled yellowish brown (10YR 5/6) and brown (10YR 5/3), stratified sandy loam and gravelly sandy loam; massive; friable; neutral.

The solum ranges from 43 to 60 inches in thickness. The Bt horizon has value of 4 or 5. It is medium acid to

neutral. The 2Bt horizon has value of 4 or 5. It is clay loam, loam, or sandy loam and has thin strata of the gravelly analog of those textures. Some pedons do not have gravelly textures. The clay content in the control section ranges from 18 to 35 percent. The 2C horizon has value of 4 or 5 and chroma of 3 to 6. It is stratified sandy loam, loam, or silt loam and has thin strata of the gravelly analog of those textures. It is medium acid to moderately alkaline.

## Chatsworth Series

The Chatsworth series consists of moderately well drained, very slowly permeable soils on till plains and moraines. These soils formed in silty clay or silty clay loam glacial till. Slope ranges from 4 to 10 percent.

Chatsworth soils commonly are adjacent to Clarence, Elliott, Swygert, and Zook soils. The somewhat poorly drained Clarence, Elliott, and Swygert soils have a mollic epipedon and are in the less sloping areas above Chatsworth soils. The poorly drained Zook soils are on flood plains below the Chatsworth soils.

Typical pedon of Chatsworth silty clay, 4 to 10 percent slopes, 236 feet south and 272 feet east of the northwest corner of sec. 29, T. 26 N., R. 9 E.

Ap—0 to 5 inches; dark grayish brown (2.5Y 4/2) silty clay, light brownish gray (2.5Y 6/2) dry; moderate fine angular blocky structure; firm; strong effervescence; moderately alkaline; clear smooth boundary.

Bt—5 to 13 inches; olive (5Y 4/3) silty clay; few fine distinct gray (5Y 5/1) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; strong effervescence; moderately alkaline; clear smooth boundary.

BC—13 to 18 inches; olive (5Y 5/3) silty clay; common fine distinct gray (5Y 5/1) mottles; moderate fine prismatic structure; very firm; strong effervescence; moderately alkaline; gradual smooth boundary.

C—18 to 60 inches; light olive brown (2.5Y 5/4) silty clay; many fine prominent gray (5Y 5/1) mottles; massive; very firm; strong effervescence; moderately alkaline.

The solum ranges from 18 to 24 inches in thickness. Free carbonates are within a depth of 18 inches.

The A or Ap horizon has hue of 10YR or 2.5Y and value of 3 or 4. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 or 3. It is

dominantly silty clay but in some pedons is silty clay loam. It generally is mildly alkaline or moderately alkaline, but some pedons have subhorizons that are slightly acid. The C horizon is dominantly silty clay but in some pedons is silty clay loam. It is mildly alkaline or moderately alkaline.

### Clarence Series

The Clarence series consists of somewhat poorly drained, very slowly permeable soils on till plains and moraines. These soils formed in a thin layer of loess and in the underlying silty clay or clay glacial till. Slope ranges from 0 to 5 percent.

Clarence soils are similar to Swygert soils and commonly are adjacent to Chatsworth, Rowe, and Rutland soils. The moderately well drained Chatsworth soils are on steeper side slopes than those of Clarence soils. The poorly drained Rowe soils are in shallow depressions and drainageways below Clarence soils. Rutland and Swygert soils have less clay in the control section than Clarence soils and have a thicker solum. They are in positions similar to those of Clarence soils.

Typical pedon of Clarence silty clay loam, 0 to 2 percent slopes, 1,837 feet south and 624 feet west of

pedes; slight effervescence; mildly alkaline; clear smooth boundary.

2BC—30 to 34 inches; olive brown (2.5Y 4/4) silty clay; common fine prominent dark yellowish brown (10YR 4/4) and few fine prominent grayish brown (2.5Y 5/2) and greenish gray (5GY 6/1) mottles; moderate medium prismatic structure; very firm; few distinct very dark gray (10YR 3/1) organic coatings on faces of pedes; few fine concretions (calcium carbonate); strong effervescence; moderately alkaline; clear smooth boundary.

2C—34 to 60 inches; olive brown (2.5Y 4/4) silty clay; common fine prominent dark yellowish brown (10YR 4/4) and few fine prominent olive gray (5Y 5/2) mottles; massive; very firm; strong effervescence; moderately alkaline.

The solum ranges from 25 to 38 inches in thickness. The depth to free carbonates ranges from 20 to 30 inches. The mollic epipedon is 10 to 12 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or silt loam in uneroded pedons and ranges to silty clay in eroded pedons. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is medium acid to moderately alkaline. The clay content in the control section ranges

from 50 to 60 percent. The C horizon is silty clay or clay.

The dark surface layer of Clarence silty clay, 2 to 5

Ap—0 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular

Typical pedon of Corwin clay loam, 5 to 10 percent slopes, severely eroded, 145 feet north and 1,100 feet west of the southeast corner of sec. 19, T. 24 N., R. 7 E.

and moderately slow in the lower part. Slope ranges from 1 to 5 percent.

Dana soils are similar to Symerton and Varna soils and commonly are adjacent to Drummer and Raub soils. The poorly drained Drummer soils are in

drainage and depression below Dana soils. The

0 to 8 inches; mixed brown (10YR 4/3) and dark

brown (10YR 3/3) clay loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; few pebbles; strongly acid; abrupt smooth boundary.

Bt1—8 to 15 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic coatings on faces of peds and many distinct brown (10YR 4/3) clay films on faces of peds; few pebbles; medium acid; clear smooth boundary.

Bt2—15 to 25 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few pebbles; slightly acid; clear smooth boundary.

somewhat poorly drained Raub soils are in slightly lower positions than those of Dana soils. Symerton soils have more gravel and sand throughout than Dana soils. Varna soils have more clay in the control section than Dana soils.

Typical pedon of Dana silt loam, 1 to 5 percent slopes, 1,865 feet north and 1,275 feet east of the southwest corner of sec. 17, T. 24 N., R. 7 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine granular structure;

faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.  
 2C—61 to 72 inches; olive brown (2.5YR 4/4) silt loam;

Bt2—18 to 27 inches; dark yellowish brown (10YR 4/4) silty clay; many fine prominent grayish brown (2.5Y 5/2) mottles; strong fine prismatic structure parting

mottles; massive; firm; strong effervescence; mildly alkaline.

The solum ranges from 40 to more than 60 inches in thickness. The depth to free carbonates ranges from 40 to 60 inches. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap and A horizons have value of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is strongly acid or medium acid. The 2Bt horizon is medium acid to neutral. The clay content in the control

common distinct dark grayish brown (2.5Y 4/2) clay films and few prominent dark gray (10YR 4/1) organic coatings on faces of peds; few fine and medium concretions (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt3—27 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine prominent grayish brown (2.5Y 5/2) mottles; strong fine prismatic structure parting to fine and medium angular blocky; firm; many thin dark grayish brown (2.5Y 4/2) clay films and common prominent dark gray (10YR 4/1)

moderately permeable soils on outwash plains and till plains. These soils formed in loess and in the underlying silty and loamy outwash. Slope ranges from 0 to 2 percent.

Drummer soils are similar to Pella and Selma soils

prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark gray (5Y 4/1) clay films in root channels; very dark gray (10YR 3/1) krotovinas at a depth of 53 inches; common fine and medium pebbles; neutral; gradual smooth boundary.

Raub soils. The somewhat poorly drained Brenton and Raub soils have an argillic horizon and are in slightly higher positions than those of Drummer soils. Milford soils have more clay in the control section than Drummer soils. They are in similar positions or in

2Cg—55 to 60 inches; mottled gray (5Y 5/1), yellowish brown (10YR 5/6), and grayish brown (2.5Y 5/2), stratified silty clay loam and loam; massive; friable; common fine and medium pebbles; neutral.

southeast corner of sec. 25, T. 25 N., R. 7 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; friable; neutral; abrupt smooth boundary.

AB—8 to 13 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Bt1—13 to 20 inches; dark yellowish brown (10YR 4/4) silty clay; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine angular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; abrupt smooth boundary.

from 10 to 18 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silt loam, but the range includes silty clay loam. Some pedons have a Bt horizon. The 2Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. It is silty clay or silty clay loam. It is medium acid to neutral in the upper part and neutral to mildly alkaline in the lower part. The clay content in the control section ranges from 35 to 45 percent. The 2C horizon is mildly alkaline or moderately alkaline.

The dark surface layer of Elliott silt loam, 2 to 5 percent slopes, eroded, is thinner than is definitive for the Elliott series. This difference, however, does not significantly alter the usefulness or behavior of the soil.

### Harpster Series

The Harpster series is a silty clay loam, medium acid to

clear smooth boundary.

2Bt2—20 to 24 inches; light olive brown (2.5Y 5/4) silty clay; common fine distinct yellowish brown (10YR 5/6) and olive gray (5Y 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular dark accumulations

moderately permeable soils on outwash plains and lake plains. These soils formed in calcareous, silty sediments. Slopes range from 0 to 2 percent.

Harpster soils are similar to Pella soils and commonly are adjacent to Drummer and Pella soils. Drummer and Pella soils do not have a calcic surface horizon and are in positions similar to those of Harpster soils.

loam; few fine distinct olive (5Y 4/4) and dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few snail shells; few pebbles; slight effervescence; 5 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Bg3—31 to 36 inches; dark gray (5Y 4/1) silty clay loam; common medium distinct olive (5Y 4/4) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; slight effervescence; 2 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Bg4—36 to 41 inches; mottled olive brown (2.5Y 4/4), olive yellow (2.5Y 6/6), and gray (5Y 5/1) silty clay loam; weak coarse angular blocky structure; firm; few pebbles; slight effervescence; 2 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Cg1—41 to 56 inches; mottled gray (5Y 5/1) and light olive brown (2.5Y 5/6) silt loam; few coarse prominent dark yellowish brown (10YR 4/4) mottles; massive; firm; few pebbles; strong effervescence; 16 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Cg2—56 to 60 inches; gray (10YR 5/1) loam; about 5 percent gravel; massive; friable; strong effervescence; moderately alkaline.

The solum ranges from 41 to 46 inches in thickness. The mollic epipedon ranges from 15 to 21 inches in thickness. Reaction is mildly alkaline or moderately alkaline throughout the profile.

The Apk and Ak horizons have hue of 10YR or are neutral. They have chroma of 1 or 0. They are silty clay loam or silt loam. The Bg horizon has hue of 10YR, 5Y, or 2.5Y and value of 4 to 6. The clay content in the control section ranges from 27 to 35 percent. The Cg

Slope ranges from 0 to 2 percent.

Houghton soils commonly are adjacent to the poorly drained Ashkum, Bryce, and Drummer soils. The adjacent soils formed entirely in mineral material and are in slightly higher positions than those of Houghton soils.

Typical pedon of Houghton muck, 150 feet south and 2,508 feet west of the northeast corner of sec. 26, T. 25 N., R. 7 E.

Oa1—0 to 12 inches; sapric material, black (N 2/0) broken face and rubbed; 2 percent fiber; moderate fine granular structure; slightly sticky; common fine roots; neutral; clear smooth boundary.

Oa2—12 to 20 inches; sapric material, very dark gray (10YR 3/1) broken face, very dark grayish brown (10YR 3/2) rubbed; less than 1 percent fiber; moderate fine angular blocky structure; slightly sticky; few fine roots; neutral; gradual smooth boundary.

Oa3—20 to 40 inches; sapric material, very dark grayish brown (10YR 3/2), broken face and rubbed; less than 1 percent fiber; weak medium angular blocky structure; slightly sticky; few fine roots; neutral; gradual smooth boundary.

Oa4—40 to 60 inches; sapric material, very dark gray (10YR 3/1) broken face, very dark grayish brown (10YR 3/2) rubbed; less than 1 percent fiber; massive; slightly sticky; no roots; mildly alkaline.

The organic material is more than 51 inches thick. The organic fibers are derived primarily from herbaceous plants, but in some layers the content of woody material is as much as 30 percent.

The Oa horizon has hue of 10YR or 7.5YR or is neutral. It has value of 2 or 3 and chroma of 0 to 3. It is medium acid to mildly alkaline.

## Jasper Series

The Jasper series consists of well drained, moderately permeable soils on outwash plains and lake plains. These soils formed in loamy and silty outwash.

Slope ranges from 1 to 5 percent.

and outwash. In addition, Camden soils do not have a mollic epipedon.

Typical pedon of Jasper loam, 1 to 5 percent slopes, 1510 feet south and 112 feet west of the northeast

and chroma of 3 to 6. It is loam, clay loam, sandy clay loam, silty clay loam, or sandy loam. It is medium acid to neutral. The clay content in the control section ranges from 18 to 32 percent. The content of sand

corner of sec. 7, T. 27 N., R. 9 E.

coarser than very fine sand is more than 15 percent. The C horizon is stratified silt loam, loam, or sandy

5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; friable; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 2 percent concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt3—32 to 39 inches; olive brown (2.5Y 4/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

BC—39 to 48 inches; light olive brown (2.5Y 5/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2) and many fine prominent yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

C—48 to 60 inches; light olive brown (2.5Y 5/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2), many fine prominent yellowish brown

addition, Drummer soils have less clay in the control section.

Typical pedon of Martinton silt loam, 970 feet north and 820 feet west of the southeast corner of sec. 1, T. 23 N., R. 8 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark

gray (10YR 4/1) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

AB—10 to 15 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; firm; neutral; clear smooth boundary.

Bt1—15 to 26 inches; brown (10YR 5/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and dark grayish brown (2.5Y 4/2) mottles; moderate very fine angular blocky structure; firm; common faint dark grayish brown (10YR 4/2) clay films and common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—26 to 39 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

layers of silt loam, sandy loam, silty clay loam, or loam. It is mildly alkaline or moderately alkaline.

### Milford Series

The Milford series consists of poorly drained, moderately slowly permeable soils on lake plains. These soils formed in dominantly silty lacustrine sediments. Slope ranges from 0 to 2 percent.

Milford soils are similar to Ashkum and Bryce soils and commonly are adjacent to Bryce, Drummer, Martinton, and Pella soils. Ashkum soils formed in glacial till. Bryce, Drummer, and Pella soils are in positions similar to those of Milford soils. Bryce soils have more clay in the control section than Milford soils, and Drummer and Pella soils have less clay in the control section. In addition, Pella soils have free carbonates within a depth of 40 inches. The somewhat poorly drained Martinton soils are in slightly higher positions than those of Milford soils.

Typical pedon of Milford silty clay loam, 2,577 feet north and 190 feet east of the southwest corner of sec. 24, T. 26 N., R. 9 E.

- Ap—0 to 9 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.
- A—9 to 16 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; neutral; clear smooth boundary.
- Btg1—16 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate fine angular blocky; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.
- Btg2—23 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.
- Btg3—36 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate to weak medium prismatic structure; firm; common faint dark grayish brown (2.5Y 4/2) clay films on faces of

peds; dark grayish brown (2.5Y 4/2) krotovinas between depths of 40 and 47 inches; neutral; gradual smooth boundary.

- Cg—52 to 60 inches; grayish brown (2.5Y 5/2), stratified silt loam, loam, silt, and silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; slight effervescence; mildly alkaline.

The solum ranges from 45 to 52 inches in thickness. The depth to free carbonates is more than 52 inches. The mollic epipedon ranges from 12 to 21 inches in thickness.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2. It is silty clay or silty clay loam. It is mildly alkaline to medium acid. The clay content in the control section ranges from 35 to 42 percent. The Cg horizon is stratified loam, silty clay loam, silt, or silt loam.

### Morley Series

The Morley series consists of moderately well drained soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. They are moderately slowly permeable in the upper part of the solum and slowly permeable in the lower part and in the substratum. Slope ranges from 1 to 5 percent.

Morley soils commonly are adjacent to Ashkum, Blount, and Sawmill soils. The poorly drained Ashkum soils have a mollic epipedon, do not have an argillic horizon, and are in lower positions than those of Morley soils. The somewhat poorly drained Blount soils are in slightly lower positions than those of Morley soils. The poorly drained Sawmill soils are on flood plains below Morley soils.

Typical pedon of Morley silt loam, 1 to 5 percent slopes, 1,145 feet north and 610 feet east of the southwest corner of sec. 30, T. 23 N., R. 10 E.

- Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.
- Ap2—5 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; friable; neutral; abrupt smooth boundary.
- BA—8 to 11 inches; brown (10YR 4/3) silt loam; moderate very fine angular blocky structure; friable; many faint very dark grayish brown (10YR 3/2)

organic coatings on faces of peds; medium acid; clear smooth boundary.

2Bt1—11 to 16 inches; brown (10YR 4/3) silty clay loam; moderate fine prismatic structure parting to moderate very fine and fine angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt2—16 to 24 inches; olive brown (2.5Y 4/4) silty clay; few fine distinct olive (5Y 5/3) mottles; strong fine and medium prismatic structure parting to strong fine and medium angular blocky; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—24 to 29 inches; olive brown (2.5Y 4/4) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) and few fine prominent light olive gray (5Y 6/2) mottles; moderate medium prismatic structure; firm; few faint dark brown (10YR 4/3) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2BC—29 to 40 inches; olive brown (2.5Y 4/4) silty clay loam; few medium faint light olive brown (2.5Y 5/6)

Ridgeville, and Selma soils. The poorly drained Pella and Selma soils have more clay in the control section than Onarga soils and are in lower positions. The somewhat poorly drained Ridgeville soils also are in lower positions.

Typical pedon of Onarga fine sandy loam, 1 to 5 percent slopes, 858 feet south and 2,094 feet west of the northeast corner of sec. 11, T. 27 N., R. 9 E.

Ap—0 to 10 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate fine subangular blocky structure; friable; common faint very dark grayish brown (10YR 3/2) organic coatings and common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 22 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

moderately permeable soils on lake plains. These soils formed in silty lacustrine sediments and in the underlying silty and loamy glacial outwash. Slope ranges from 0 to 2 percent.

Pella soils are similar to Drummer and Selma soils and commonly are adjacent to La Hogue, Milford, and Selma soils. Drummer, Milford, and Selma soils do not have free carbonates within a depth of 40 inches and are in positions similar to those of Pella soils. Milford soils have more clay throughout than Pella soils, and Selma soils have more sand in the control section. The somewhat poorly drained La Hogue soils also have more sand in the control section and do not have free carbonates within a depth of 40 inches. They are in slightly higher positions than those of Pella soils.

Typical pedon of Pella silty clay loam, 190 feet north and 2,225 feet west of the southeast corner of sec. 14, T. 27 N., R. 9 E.

- Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate very fine and fine granular structure; friable; slightly acid; abrupt smooth boundary.
- A—7 to 12 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate fine and very fine granular structure; friable; neutral; clear smooth boundary.
- Bg1—12 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine and medium prismatic structure parting to moderate fine and very fine angular blocky; friable; neutral; clear smooth boundary.
- Bg2—20 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak fine and medium prismatic structure parting to moderate fine and medium angular blocky; friable; slight effervescence; mildly alkaline; clear smooth boundary.
- Bg3—27 to 33 inches; gray (5Y 6/1) silty clay loam; many medium prominent light olive brown (2.5Y 5/4) and common fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; very dark gray (10YR 3/1) krotovinas; slight effervescence; mildly alkaline; gradual wavy boundary.
- 2BCg—33 to 42 inches; gray (5Y 6/1) silt loam that has a high content of sand; moderate medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; slight effervescence; moderately

alkaline; gradual wavy boundary.

2Cg—42 to 60 inches; gray (5Y 6/1), stratified silt loam, loam, and sandy loam; many medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; massive; friable; strong effervescence; moderately alkaline.

The solum ranges from 30 to 50 inches in thickness. The depth to free carbonates is 20 to 40 inches. The mollic epipedon ranges from 10 to 22 inches in thickness. The clay content in the control section ranges from 27 to 35 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have value of 2 or 3 and chroma of 2 or less. They are silty clay loam or silt loam. The Bg horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. It is clay loam or silty clay loam. It is neutral or mildly alkaline. The 2BCg horizon is silt loam, loam, or sandy loam and in some pedons is stratified. The 2Cg horizon is stratified silty clay loam, silt loam, loam, or sandy loam.

## Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils on till plains, outwash plains, and lake plains. These soils formed in silty and clayey local wash. Slope ranges from 0 to 2 percent.

Peotone soils are similar to Rantoul soils and commonly are adjacent to Ashkum, Drummer, Milford, and Pella soils. The poorly drained Ashkum, Drummer, Milford, and Pella soils are not cumulic and are in slightly higher positions than those of Peotone soils. Also, Drummer and Pella soils have less clay in the control section. Rantoul soils have more clay in the control section than Peotone soils.

Typical pedon of Peotone silty clay loam, 315 feet south and 2,233 feet east of the northwest corner of sec. 21, T. 29 N., R. 9 E.

- Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; clear smooth boundary.
- A—7 to 13 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; clear smooth boundary.
- Bg1—13 to 27 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate medium angular blocky structure; friable; neutral; clear smooth boundary.
- Bg2—27 to 41 inches; dark gray (10YR 4/1) silty clay;

common fine faint dark grayish brown (10YR 4/2) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; mildly alkaline; clear smooth boundary.

Bg3—41 to 50 inches; dark gray (10YR 4/1) silty clay; common medium faint dark grayish brown (10YR 4/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; mildly alkaline; clear smooth boundary.

Cg—50 to 60 inches; dark gray (10YR 4/1) silty clay loam; few fine faint dark grayish brown (10YR 4/2) and few fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; slight effervescence; mildly alkaline.

The solum ranges from 39 to 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness. The clay content in the control section ranges from 35 to 45 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have chroma of 1 or less. The Bg horizon has hue of 10YR or 5Y or is neutral. It has value of 2 to 5 and chroma of 2 or less. It is slightly acid to mildly alkaline. The Cg horizon dominantly is silty clay loam but in some pedons is silt loam. It is mildly alkaline or moderately alkaline. Some pedons do not have free carbonates in the lower part.

### Proctor Series

The Proctor series consists of well drained soils on outwash plains. These soils formed in loess and in the underlying dominantly loamy glacial outwash. Permeability is moderate in the solum and moderately rapid in the substratum. Slope ranges from 1 to 5 percent.

Proctor soils are similar to Camden and Jasper soils and commonly are adjacent to Brenton and Drummer soils. The somewhat poorly drained Brenton soils are in slightly lower positions than those of Proctor soils.

fine granular structure; friable; slightly acid; clear smooth boundary.

AB—10 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; common faint very dark brown (10YR 2/2) organic coatings; medium acid; clear smooth boundary.

Bt1—15 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine angular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films and common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; gradual smooth boundary.

Bt2—25 to 33 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; common faint dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

2BC—33 to 41 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium prismatic structure; friable; slightly acid; clear smooth boundary.

2C—41 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; friable; neutral.

The solum ranges from 40 to 56 inches in thickness. The depth to free carbonates is more than 40 inches. The mollic epipedon ranges from 11 to 18 inches in thickness. The clay content in the control section ranges from 27 to 34 percent.

The Bt horizon has value of 3 to 5 and chroma of 3 or 4. The 2BC horizon has value of 3 to 5 and chroma of 4 to 6. It is loam and clay loam. It is medium acid to mildly alkaline. The 2C horizon is stratified sandy loam, loam, loamy sand, or silt loam. It is slightly acid to mildly alkaline.

### Rantoul Series

The Rantoul series consists of very poorly drained, very slowly permeable soils on till plains and lake plains. These soils formed in clayey local wash. Slope

Ap—0 to 8 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

A—8 to 13 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak very fine granular structure; firm; neutral; abrupt smooth boundary.

BA—13 to 21 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; moderate very fine angular blocky structure; firm; neutral; clear smooth boundary.

Bg1—21 to 31 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; few fine prominent olive brown (2.5Y 4/4) mottles; weak fine prismatic structure parting to moderate fine and very fine angular blocky; firm; neutral; clear smooth boundary.

Bg2—31 to 38 inches; black (5Y 2/1) silty clay, dark gray (5Y 4/1) dry; few fine distinct olive gray (5Y

slightly higher positions than those of Raub soils. The poorly drained Drummer soils are in depressions and drainageways below Raub soils. Brenton and La Hogue soils have more sand in the lower part than Raub soils.

Typical pedon of Raub silt loam, 0 to 3 percent slopes, 170 feet west and 964 feet south of the northeast corner of sec. 18, T. 24 N., R. 7 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A—10 to 16 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common distinct black (10YR 2/1) organic coatings

common medium distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (10YR 6/2) mottles; massive; firm; common pebbles; violent effervescence; moderately alkaline.

The solum ranges from 45 to more than 60 inches in thickness. The depth to free carbonates ranges from 36 to 54 inches. The mollic epipedon ranges from 10 to 17 inches in thickness.

The 2BC horizon has hue of 10YR or 2.5Y, value of

The solum ranges from 39 to 48 inches in thickness. It is medium acid or slightly acid throughout. The mollic epipedon is 10 to 14 inches thick. The clay content in the control section ranges from 14 to 18 percent. The total content of sand ranges from 45 to 70 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has chroma of 2 to 6. The BC and C horizons are stratified sandy loam, loamy sand, and sand.

### Ridgeville Series

The Ridgeville series consists of somewhat poorly

The Rowe series consists of poorly drained, very slowly permeable soils on till plains and moraines. These soils formed in silty and clayey local wash and in the underlying silty clay or clay glacial till. Slope ranges

5/6) mottles; moderate fine prismatic structure; firm; fine granular structure; friable; slightly acid; clear

- of peds; mildly alkaline; gradual smooth boundary.
- 2BCg—41 to 52 inches; olive gray (5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few distinct dark gray (5Y 4/1) clay films on faces of peds; slight effervescence; mildly alkaline; gradual smooth boundary.
- 2Cg—52 to 60 inches; olive gray (5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; massive; very firm; slight effervescence; moderately alkaline.

The solum ranges from 32 to 52 inches in thickness. The depth to free carbonates is 30 to 55 inches. The mollic epipedon ranges from 10 to 24 inches in thickness. The clay content in the control section ranges from 48 to 60 percent.

The Ap and A horizons have value of 2 or 3. The 2Btg horizon has hue of 2.5Y or 5Y and chroma of 2 to

- BA—12 to 16 inches; brown (10YR 4/3) silt loam; weak medium and fine angular blocky structure parting to moderate fine granular; friable; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
- Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and fine angular blocky structure; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.
- Bt2—23 to 29 inches; brown (10YR 4/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium and fine angular blocky; firm; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine accumulations (iron and manganese oxides); mildly alkaline; clear smooth boundary.
- Bt3—29 to 34 inches; brown (10YR 4/3) silty clay loam;

thickness. The clay content in the control section ranges from 35 to 45 percent.

The Ap and A horizons have value of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is strongly acid to moderately alkaline. The 2BC and 2C horizons are neutral to moderately alkaline.

### Sawmill Series

The Sawmill series consists of poorly drained

The depth to free carbonates is more than 40 inches. The mollic epipedon ranges from 29 to 36 inches in thickness. The clay content in the control section ranges from 5 to 40 percent.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral. They have chroma of 0 or 1. They are silt loam or silty clay loam. The Bg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. It is slightly acid to mildly alkaline. The Cg horizon is dominantly silty clay loam, but in some pedons it has

(2.5Y 5/6) mottles; moderate medium angular blocky structure; firm; mildly alkaline; clear smooth boundary.

BCg—37 to 46 inches; mottled gray (5Y 6/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/6) loam; weak medium prismatic structure; firm; mildly alkaline; gradual smooth boundary.

Cg—46 to 60 inches; mottled gray (5Y 6/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/6), stratified loam and sandy loam; massive; friable; slight effervescence; moderately alkaline.

The solum ranges from 40 to 55 inches in thickness. The depth to free carbonates ranges from 38 to 60 inches. The mollic epipedon ranges from 10 to 20 inches in thickness. The clay content in the control section ranges from 20 to 30 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have chroma of 0 to 2. They are loam, silt loam, or clay loam. The Bg horizon has value of 4 to 6. It is clay loam, silt loam, sandy loam, or loam. It is slightly acid to moderately alkaline. The Cg horizon is

dominantly stratified sandy loam, loam, or silt loam but in some pedons has gravelly strata. It is neutral to moderately alkaline.

## Swygert Series

The Swygert series consists of somewhat poorly drained soils on till plains and moraines. These soils formed in loess or lacustrine sediments and in the underlying silty clay glacial till. They are slowly permeable in the upper part and very slowly permeable in the lower part. Slope ranges from 0 to 5 percent.

Swygert soils are similar to Clarence soils and commonly are adjacent to Bryce and Rutland soils. The poorly drained Bryce soils do not have an argillic horizon and are in slightly lower positions than those of Swygert soils. Rutland soils have less clay in the control section than Swygert soils. They are in positions similar to those of Swygert soils. Clarence soils have more clay throughout than Swygert soils and have a thinner solum.

Typical pedon of Swygert silty clay loam, 0 to 2 percent slopes, 1,014 feet north and 396 feet east of the southwest corner of sec. 3, T. 23 N., R. 10 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and very fine granular structure; friable; neutral; abrupt smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam,

dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.

AB—13 to 18 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine angular blocky structure parting to moderate fine and medium granular; friable; neutral; clear smooth boundary.

2Bt1—18 to 28 inches; light olive brown (2.5Y 5/4) silty clay; common fine prominent yellowish brown (10YR 5/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; common distinct very dark grayish brown (10YR 3/2) organic coatings and many prominent dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—28 to 36 inches; light olive brown (2.5Y 5/4) silty clay; common fine prominent yellowish brown (10YR 5/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure

parting to moderate medium angular blocky; firm; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2BC—36 to 48 inches; light olive brown (2.5Y 5/4) silty clay; common medium prominent yellowish brown (10YR 5/6) and common fine prominent gray (5Y 6/1) mottles; weak medium prismatic structure; few faint dark gray (10YR 4/1) clay films on faces of peds; firm; slight effervescence; moderately alkaline; gradual wavy boundary.

2C—48 to 60 inches; light olive brown (2.5Y 5/4) silty clay; many medium prominent yellowish brown (10YR 5/6) and common fine prominent gray (5Y 6/1) mottles; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 36 to 55 inches in thickness. The depth to glacial till is less than 43 inches. The depth to free carbonates ranges from 20 to 43 inches. The mollic epipedon ranges from 10 to 18 inches in thickness. The clay content in the control section ranges from 45 to 50 percent.

The Ap and A horizons have chroma of 1 or 2. They are dominantly silty clay loam, but the range includes silt loam. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 to 6. It is medium acid to moderately alkaline. The 2C horizon is mildly alkaline or moderately alkaline.

The dark surface layer of Swygert silty clay loam, 2

to 5 percent slopes, eroded, is thinner than is definitive for the Swygert series. This difference, however, does not alter the usefulness or behavior of the soil.

### Symerton Series

The Symerton series consists of moderately well drained soils on till plains and moraines. These soils formed in loess, loamy outwash, and the underlying silty clay loam glacial till. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slope ranges from 1 to 5 percent.

Symerton soils are similar to Dana and Varna soils and commonly are adjacent to Ashkum and Elliott soils. Ashkum, Elliott, and Varna soils have less gravel and sand and more clay in the control section than Symerton soils. The poorly drained Ashkum soils are in depressions and drainageways below Symerton soils. The somewhat poorly drained Elliott soils are in slightly lower positions than those of Symerton soils. Dana soils have less gravel and sand in the control section than Symerton soils.

Typical pedon of Symerton silt loam, 1 to 5 percent slopes, 1,796 feet north and 1,636 feet east of the southwest corner of sec. 7, T. 23 N., R. 9 E.

medium prismatic structure; firm; slight effervescence; mildly alkaline; clear smooth boundary.

3C—37 to 60 inches; olive (5Y 5/3) silty clay loam; common fine prominent gray (N 6/0) mottles; massive; very firm; strong brown (7.5YR 5/8) iron accumulations; slight effervescence; mildly alkaline.

The solum ranges from 37 to 50 inches in thickness. The depth to free carbonates ranges from 33 to 49 inches. The mollic epipedon ranges from 10 to 21 inches in thickness. The clay content in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The 2Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is gravelly clay loam, clay loam, silty clay loam, or loam. It is medium acid to mildly alkaline. The 3BC and 3C horizons are neutral to moderately alkaline.

### Varna Series

The Varna series consists of moderately well drained, slowly permeable or moderately slowly permeable soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. Slope ranges from 1 to 5 percent.

common fine prominent light olive gray (5Y 6/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2BC—27 to 39 inches; olive brown (2.5Y 4/4) silty clay loam; many medium prominent light olive gray (5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; common faint grayish brown (2.5Y 5/2) clay films on faces of peds; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—39 to 60 inches; mottled light olive brown (2.5Y 5/4), light gray (5Y 6/1), and yellowish brown (10YR 5/6) silty clay loam; massive; firm; common greenish gray (5GY 6/1) pressure faces; strong effervescence; moderately alkaline.

The solum ranges from 25 to 41 inches in thickness.

north and 180 feet west of the southeast corner of sec.  
11, T. 25 N., R. 9 E.

Ap1—0 to 11 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; neutral; clear smooth boundary.

Ap2—11 to 17 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; neutral; clear smooth boundary.

AB—17 to 25 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; friable; neutral; gradual smooth boundary.

Bg1—25 to 38 inches; black (10YR 2/1) silty clay; many medium prominent dark gray (5Y 4/1) mottles; weak fine angular blocky structure; firm; mildly alkaline; gradual smooth boundary.

Bg2—38 to 45 inches; black (10YR 2/1) silty clay; many medium prominent dark gray (5Y 4/1) mottles; weak

## Formation of the Soils

The processes involved in the formation of soils are numerous and are interrelated in a very complex way. These processes can be grouped into five major factors—the physical and mineralogical composition of the parent material; relief; the kind of plant and animal life on or in the soil, especially the native vegetation; the climate, especially rainfall and temperature; and the length of time that soil-forming processes have acted on the parent material (6).

In Ford County parent material and relief are the most influential factors of soil formation. These factors vary more within the county than climate, native vegetation, and time, which are relatively constant. The parent material has left the strongest imprint on the soils in the county.

### Parent Material

The strong influence of parent material on the soils in Ford County was recognized in the first soil survey of the county (7, 8). The dominant parent materials were deposited during the Woodfordian Substage of the Wisconsin Glaciation, about 12,500 to 22,000 years ago (13). Four distinct methods of deposition have resulted in four types of deposits—glacial till, glacial

and Rowe soils. Ashkum and Elliott soils formed in silty clay loam till. Dana and Raub soils formed in loam and silt loam till. In general, soils formed in the loamy and silty till have a solum that is thicker than that of soils formed in the clayey till.

*Glacial outwash* was deposited by moving water in front of the melting ice sheets. Layers of deposition are readily apparent within very short vertical distances but are less obvious within horizontal distances. The outwash in Ford County is silty, loamy, and sandy and in some areas has gravelly layers. It is generally friable. Onarga and Ridgeville soils formed in outwash.

*Lacustrine material* was deposited in the relatively still water of glacial lakes, such as glacial Lake Watseka. Vertical variation is greater than horizontal variation. The layers are commonly thicker than those in glacial outwash. The lacustrine material is silty and clayey and is friable or firm. Pella, Milford, and Martinton are examples of soils in glacial lakebeds. Many other soils, including Rutland soils, show evidence of lacustrine material deposited on top of till. Also, narrow outwash ridges are beach deposits of past shorelines of glacial lakes. Selma, Ridgeville, and Onarga are examples of outwash soils on beach ridges.

*Lake level* is indicated by the dashed line that covers the

Houghton soils formed in organic material.

acreage in Ford County. Therefore, most of the soils have a dark, fertile, relatively thick surface soil. The

vegetation. Their surface layer is lighter colored and

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# Glossary

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**ABC soil.** A soil having an A, a B, and a C horizon.

**Ablation till.** Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

**AC soil.** A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern

**Basal till.** Compact glacial till deposited beneath the ice.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

**Bedding planes.** Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

**Bedding system.** A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

**Capillary water.** Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds

**Chiselling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Coarse fragments.** If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Contour stripcropping.** Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Corrosive.** High risk of corrosion to uncoated steel or deterioration of concrete.

**Colluvium.** Soil material, rock fragments, or both

improve and protect the soil between periods of

readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but

accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion (geologic).* Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as

transported and deposited by glacial ice.

**Glaciofluvial deposits** (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

**Glaciolacustrine deposits.** Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

**Ground water** (geology). Water filling all the unblocked pores of underlying material below the water table.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr horizon.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Impervious soil.** A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

**Infiltration.** The downward entry of water into the

immediate surface of soil or other material, as

**Moderately fine textured soil.** Clay loam, sandy clay

water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2 .....	very low
0.2 to 0.4 .....	low
0.4 to 0.75 .....	moderately low
0.75 to 1.25 .....	moderate

**Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

**Moraine** (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The downward movement of water through the soil.

**Percolates slowly** (in tables). The slow movement of water through the soil, adversely affecting the specified use.

**Permeability.** The quality of the soil that enables water to move downward through the profile.

Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow .....	less than 0.06 inch
Slow .....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid .....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid .....	below 4.5
Very strongly acid .....	4.5 to 5.0
Strongly acid .....	5.1 to 5.5
Medium acid .....	5.6 to 6.0
Slightly acid .....	6.1 to 6.5
Neutral .....	6.6 to 7.3
Mildly alkaline .....	7.4 to 7.8
Moderately alkaline .....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Rill.** A steep-sided channel resulting from accelerated

features that affect its use and management. For example, slope, stoniness, and thickness.

erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm

of all organic soil material.

**Seepage** (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

**Sequum**. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

**Series, soil**. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Sheet erosion**. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

**Shrink-swell**. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silt**. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Similar soils**. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

**Site index**. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slickensides**. Polished and grooved surfaces produced

resulting from restricted permeability in the soil.

**Small stones** (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soil**. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates**. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand .....	2.0 to 1.0
Coarse sand .....	1.0 to 0.5
Medium sand .....	0.5 to 0.25
Fine sand .....	0.25 to 0.10
Very fine sand .....	0.10 to 0.05
Silt .....	0.05 to 0.002
Clay .....	less than 0.002

**Solum**. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stones**. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

**Stony**. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Stripcropping**. Growing crops in a systematic arrangement of strips or bands which provide

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters).

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to

## Tables

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TABLE 1.--TEMPERATURE AND PRECIPITATION  
(Recorded in the period 1951-80 at Kankakee, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January-----	30.8	14.2	22.5	56	-17	0.3	1.53	0.65	2.48	4	7.6
February-----	35.7	18.6	27.2	58	-10	1.4	1.36	.71	2.14	4	5.6
March-----	46.7	28.2	37.5	73	4	19.8	2.46	1.41	3.66	6	4.0
April-----	61.7	39.7	50.7	84	21	130.3	4.02	2.67	4.98	8	.6
May-----	73.5	49.5	61.5	92	31	368.3	3.93	2.36	5.37	7	.0
June-----	82.6	59.2	70.9	97	42	623.1	4.15	2.12	5.94	7	.0
July-----	85.5	62.8	74.4	99	48	747.4	4.51	2.30	6.42	6	.0
August-----	83.5	60.8	72.2	95	44	679.6	3.46	1.53	5.12	6	.0
September---	78.4	53.5	65.9	95	34	472.0	3.22	1.18	4.42	5	.0
October-----	66.3	42.2	54.2	87	23	188.1	2.39	.89	3.60	5	.1
November-----	49.7	31.5	40.6	74	9	32.2	2.01	1.20	2.39	5	1.9
December-----	36.2	21.1	28.7	63	-8	2.2	2.04	.69	3.05	5	5.0
Yearly:											
Average---	61.1	40.3	50.7	---	---	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,264.7	35.08	17.71	49.57	68	24.8

\*The number of growing degree days for a given month can be calculated by adding the

TABLE 2.--FREEZE DATES IN SPRING AND FALL  
(Recorded in the period 1951-80 at Kankakee, Illinois)

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 16	May 6	May 10
2 years in 10 later than--	Apr. 10	Apr. 20	May 4
5 years in 10 later than--	Mar. 31	Apr. 10	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 10	Oct. 6	Sept. 20
2 years in 10 earlier than--	Oct. 23	Oct. 18	Oct. 2
5 years in 10 earlier than--	Nov. 3	Oct. 28	Oct. 13

TABLE 3.--GROWING SEASON  
(Recorded in the period 1951-80 at Kankakee,  
Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	191	169	145
8 years in 10	200	177	151
5 years in 10	215	200	172
2 years in 10	232	218	188
1 year in 10	244	227	192



TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
23A	Blount silt loam, 0 to 3 percent slopes (where drained)
56B	Dana silt loam, 1 to 5 percent slopes
67	Harpster silty clay loam (where drained)
69	Milford silty clay loam (where drained)
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded
102	La Hogue loam
107	Sawmill silty clay loam (where drained and either protected from flooding or not frequently flooded during the growing season)
125	Selma loam (where drained)
134A	Camden silt loam, 0 to 3 percent slopes
146A	Elliott silt loam, 0 to 2 percent slopes
146B2	Elliott silt loam, 2 to 5 percent slopes, eroded
148B	Proctor silt loam, 1 to 5 percent slopes
149	Brenton silt loam
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151	Ridgeville fine sandy loam
152	Drummer silty clay loam (where drained)
153	Pella silty clay loam (where drained)
189	Martinton silt loam
192	Del Rey silt loam (where drained)
194B	Morley silt loam, 1 to 5 percent slopes
223B2	Varna silt loam, 1 to 5 percent slopes, eroded
230	Rowe silty clay loam (where drained)
232	Ashkum silty clay loam (where drained)
235	Bryce silty clay loam (where drained)
294B	Symerton silt loam, 1 to 5 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Bromegrass- alfalfa hay	Bromegrass- alfalfa
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
23A----- Blount	IIw	106	35	48	64	4.3	7.1
56B----- Dana	IIe	142	46	59	84	5.5	9.1
67----- Harpster	IIw	136	44	52	74	5.0	8.3
69----- Milford	IIw	131	48	56	81	5.2	8.6
91A----- Swygert	IIw	114	39	51	73	4.5	7.5
91B2----- Swygert	IIe	107	37	48	69	4.2	7.0
102----- La Hogue	I	129	43	56	80	5.2	8.6
103----- Houghton	Vw	---	---	---	---	---	---
107----- Sawmill	IIIw	132	42	---	---	4.9	8.1
125----- Selma	IIw	136	44	53	76	5.0	8.3

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Bromegrass- alfalfa hay	Bromegrass- alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
152----- Drummer	IIw	154	51	61	83	5.5	9.2
153----- Pella	IIw	140	48	56	78	5.2	8.6
189----- Martinton	IIw	135	45	57	84	5.3	8.8
192----- Del Rey	IIw	115	37	49	69	4.5	7.5
194B----- Morley	IIe	102	35	47	63	4.3	7.0
223B2----- Varna	IIe	120	40	51	72	4.7	7.8
230----- Rowe	IIIw	108	40	45	63	4.0	6.7
232----- Ashkum	IIw	130	47	54	79	5.0	8.3
235----- Bryce	IIw	120	43	48	70	4.4	7.3
238----- Rantoul	IIIw	99	35	36	50	3.2	5.3
241C----- Chatsworth	VIe	---	---	---	---	---	1.6
294B----- Symerton	IIe	135	44	58	82	5.3	8.9
330----- Peotone	IIw	123	42	43	58	---	---
375B----- Rutland	IIe	131	45	58	83	5.2	8.7
405----- Zook	IIw	92	35	---	---	3.5	5.8
440B----- Jasper	IIe	136	41	56	87	5.2	8.7
481A----- Raub	I	155	51	63	92	6.1	10.1
495C3----- Corwin	IVe	115	38	51	72	4.6	7.6
805. Orthents							
865**. Pits							

\* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

\*\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Common trees	Site index	Volume*	
23A----- Blount	3C	Slight	Slight	Severe	Severe	White oak-----	65	48	Eastern white pine, Scotch pine, eastern redcedar, red pine, yellow poplar.
						Northern red oak---	65	48	
						Green ash-----	---	---	
						Bur oak-----	---	---	
						Pin oak-----	---	---	
103----- Houghton	2W	Slight	Severe	Severe	Severe	White ash-----	51	35	
						Red maple-----	51	33	
						Black willow-----	---	---	
						Quaking aspen-----	56	56	
						Silver maple-----	76	30	
107----- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-----	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum-----	---	---	
						Cherrybark oak-----	---	---	
						American sycamore----	---	---	
134A----- Camden	7A	Slight	Slight	Slight	Slight	Yellow poplar-----	95	98	White oak, black walnut, green ash, eastern white pine, red pine, yellow poplar, black locust, white ash.
						White oak-----	85	67	
						Northern red oak---	85	67	
						Sweetgum-----	80	79	
						Green ash-----	76	75	
192----- Del Rey	4C	Slight	Slight	Severe	Severe	White oak-----	70	52	Austrian pine, eastern redcedar, green ash, pin oak, red maple.
						Northern red oak---	70	52	
						Green ash-----	---	---	
						Bur oak-----	---	---	
194B----- Morley	4A	Slight	Slight	Slight	Slight	White oak-----	80	62	White oak, black walnut, green ash, eastern white pine, Norway spruce, red pine, white spruce.
						Northern red oak---	80	62	
						Yellow poplar-----	90	90	
						Black walnut-----	---	---	
						Bur oak-----	---	---	
						Shagbark hickory----	---	---	

\* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
23A----- Blount	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
56B----- Dana	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
67----- Harpster	---	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osageorange.	Black willow-----	---
69----- Milford	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
91A, 91B2----- Swygert	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak-----	---
102----- La Hogue	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
103----- Houghton	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
107----- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
125----- Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
134A----- Camden	---	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
146A. Elliott					
146B2----- Elliott	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
147A----- Clarence	---	Eastern redcedar, American cranberrybush, Amur privet, Washington hawthorn, Amur honeysuckle, autumn olive.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
147B2----- Clarence	Lilac, Amur honeysuckle.	Eastern redcedar	Austrian pine-----	---	---
148B----- Proctor	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
149----- Brenton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
150B----- Onarga	---	Amur privet, Washington hawthorn, American cranberrybush, Amur honeysuckle.	Austrian pine, northern whitecedar, Osageorange, eastern redcedar.	Red pine, Norway spruce, eastern white pine.	---
151----- Ridgeville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

152----- Drummer	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
153----- Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
189----- Martinton	---	Amur privet, Amur honeysuckle,	Austrian pine, white fir, blue	Norway spruce-----	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
232----- Ashkum	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
235----- Bryce	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
238----- Rantoul	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
241C----- Chatsworth	Lilac, Amur honeysuckle.	Eastern redcedar	Austrian pine, Virginia pine.	---	---
294B----- Symerton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
330----- Peotone	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
375B----- Rutland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
405----- Zook	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Norway spruce, northern whitecedar, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
440B----- Jasper	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
481A----- Raub	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
495C3----- Corwin	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
805. Orthents					
865*. Pits					

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23A----- Blount	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
56B----- Dana	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
67----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69----- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
91A, 91B2----- Swygert	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight-----	Slight.
102----- La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
103----- Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
152----- Drummer	Severe: nodding	Severe: nodding	Severe: nodding	Severe: nodding	Severe: nodding

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
495C3----- Corwin	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight-----	Slight.
805. Orthents					
865*. Pits					

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
23A----- Blount	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
56B----- Dana	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
67----- Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
69----- Milford	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
91A, 91B2----- Swygert	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
102----- La Hogue	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
103----- Houghton	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
107----- Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
125----- Selma	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
134A----- Camden	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
146A----- Elliott	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
146B2----- Elliott	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
147A----- Clarence	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
147B2----- Clarence	Fair	Fair	Poor	Fair	Poor	Very poor	Fair	Fair	Very poor.
148B----- Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149----- Brenton	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
150B----- Onarga	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
151----- Ridgeville	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
152----- Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
153----- Pella	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
189----- Martinton	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
192----- Del Rey	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
194E----- Morley	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
223B2----- Varna	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
230----- Rowe	Poor	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
232----- Ashkum	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
235----- Bryce	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
238----- Rantoul	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
241C----- Chatsworth	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
294B----- Symerton	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
330----- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
375B----- Rutland	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
405----- Zook	Good	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
440B----- Jasper	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
481A----- Raub	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
495C3----- Corwin	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
805. Orthents									
865*. Pits									

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Page	Date	Time	Location	Remarks
1	10/10/1964	0800	San Francisco	Left for Los Angeles
2	10/10/1964	0900	San Francisco	Arrived Los Angeles
3	10/10/1964	1000	San Francisco	Left Los Angeles
4	10/10/1964	1100	San Francisco	Arrived San Francisco
5	10/10/1964	1200	San Francisco	Left San Francisco
6	10/10/1964	1300	San Francisco	Arrived San Francisco
7	10/10/1964	1400	San Francisco	Left San Francisco
8	10/10/1964	1500	San Francisco	Arrived San Francisco
9	10/10/1964	1600	San Francisco	Left San Francisco
10	10/10/1964	1700	San Francisco	Arrived San Francisco
11	10/10/1964	1800	San Francisco	Left San Francisco
12	10/10/1964	1900	San Francisco	Arrived San Francisco
13	10/10/1964	2000	San Francisco	Left San Francisco
14	10/10/1964	2100	San Francisco	Arrived San Francisco
15	10/10/1964	2200	San Francisco	Left San Francisco
16	10/10/1964	2300	San Francisco	Arrived San Francisco
17	10/10/1964	0000	San Francisco	Left San Francisco
18	10/10/1964	0100	San Francisco	Arrived San Francisco
19	10/10/1964	0200	San Francisco	Left San Francisco
20	10/10/1964	0300	San Francisco	Arrived San Francisco
21	10/10/1964	0400	San Francisco	Left San Francisco
22	10/10/1964	0500	San Francisco	Arrived San Francisco
23	10/10/1964	0600	San Francisco	Left San Francisco
24	10/10/1964	0700	San Francisco	Arrived San Francisco
25	10/10/1964	0800	San Francisco	Left San Francisco
26	10/10/1964	0900	San Francisco	Arrived San Francisco
27	10/10/1964	1000	San Francisco	Left San Francisco
28	10/10/1964	1100	San Francisco	Arrived San Francisco
29	10/10/1964	1200	San Francisco	Left San Francisco
30	10/10/1964	1300	San Francisco	Arrived San Francisco
31	10/10/1964	1400	San Francisco	Left San Francisco
32	10/10/1964	1500	San Francisco	Arrived San Francisco
33	10/10/1964	1600	San Francisco	Left San Francisco
34	10/10/1964	1700	San Francisco	Arrived San Francisco
35	10/10/1964	1800	San Francisco	Left San Francisco
36	10/10/1964	1900	San Francisco	Arrived San Francisco
37	10/10/1964	2000	San Francisco	Left San Francisco
38	10/10/1964	2100	San Francisco	Arrived San Francisco
39	10/10/1964	2200	San Francisco	Left San Francisco
40	10/10/1964	2300	San Francisco	Arrived San Francisco
41	10/10/1964	0000	San Francisco	Left San Francisco
42	10/10/1964	0100	San Francisco	Arrived San Francisco
43	10/10/1964	0200	San Francisco	Left San Francisco
44	10/10/1964	0300	San Francisco	Arrived San Francisco
45	10/10/1964	0400	San Francisco	Left San Francisco
46	10/10/1964	0500	San Francisco	Arrived San Francisco
47	10/10/1964	0600	San Francisco	Left San Francisco
48	10/10/1964	0700	San Francisco	Arrived San Francisco
49	10/10/1964	0800	San Francisco	Left San Francisco
50	10/10/1964	0900	San Francisco	Arrived San Francisco
51	10/10/1964	1000	San Francisco	Left San Francisco
52	10/10/1964	1100	San Francisco	Arrived San Francisco
53	10/10/1964	1200	San Francisco	Left San Francisco
54	10/10/1964	1300	San Francisco	Arrived San Francisco
55	10/10/1964	1400	San Francisco	Left San Francisco
56	10/10/1964	1500	San Francisco	Arrived San Francisco
57	10/10/1964	1600	San Francisco	Left San Francisco
58	10/10/1964	1700	San Francisco	Arrived San Francisco
59	10/10/1964	1800	San Francisco	Left San Francisco
60	10/10/1964	1900	San Francisco	Arrived San Francisco
61	10/10/1964	2000	San Francisco	Left San Francisco
62	10/10/1964	2100	San Francisco	Arrived San Francisco
63	10/10/1964	2200	San Francisco	Left San Francisco
64	10/10/1964	2300	San Francisco	Arrived San Francisco
65	10/10/1964	0000	San Francisco	Left San Francisco
66	10/10/1964	0100	San Francisco	Arrived San Francisco
67	10/10/1964	0200	San Francisco	Left San Francisco
68	10/10/1964	0300	San Francisco	Arrived San Francisco
69	10/10/1964	0400	San Francisco	Left San Francisco
70				

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
148B----- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
149----- Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
150B----- Onarga	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
151----- Ridgeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
152----- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
153----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
189----- Martinton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
192----- Del Rey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
194B----- Morley	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
223B2----- Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
230----- Rowe	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
232----- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
235----- Bacon	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
241C----- Chatsworth	Moderate: too clayey, dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Severe: droughty, too clayey.
294B----- Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
330----- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
375B----- Rutland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
405----- Zook	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
440B----- Jasper	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: low strength, frost action.	Slight.
481A----- Raub	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
495C3----- Corwin	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength.	Slight.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
23A----- Blount	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
56B----- Dana	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight-----	Fair: too clayey, wetness.
67----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
69----- Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
91A----- Swygert	Severe: wetness, percs slowly.	Slight-----	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
91B2----- Swygert	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
102----- La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
103----- Houghton	Severe: ponding, percs slowly.	Severe: seepage, ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.
107----- Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
125----- Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
134A----- Camden	Slight-----	Moderate: seepage.	Severe: seepage.	Slight-----	Fair: too clayey.
146A, 146B2----- Elliott	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
147A----- Clarence	Severe: wetness, percs slowly.	Slight-----	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
147B2----- Clarence	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
148B----- Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Fair: too clayey, thin layer.
149----- Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
150B----- Onarga	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
151----- Ridgeville	Severe: wetness.	Severe: seepage,	Severe: seepage,	Severe: wetness.	Poor: seepage, too sandy.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
241C----- Chatsworth	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
294B----- Symerton	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
330----- Peotone	Severe: ponding, percs slowly.	Slight-----	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
375B----- Rutland	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
405----- Zook	Severe: flooding, wetness	Severe: flooding.	Severe: flooding, wetness	Severe: flooding, wetness	Poor: too clayey, hard to pack

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
23A----- Blount	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
56B----- Dana	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
67----- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69----- Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
91A, 91B2----- Swygert	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
102----- La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
103-----	Poor:	Improbable:	Improbable:	Poor:



TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
481A----- Raub	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
495C3-----	Fair:	Improbable:	Improbable:	Fair:

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23A----- Blount	Slight-----	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily.
56B----- Dana	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope-----	Erodes easily	Erodes easily.
67----- Harpster	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
69----- Milford	Slight-----	Severe: slow refill.	Ponding, frost action.	Ponding-----	Erodes easily, ponding.	Wetness, erodes easily.
91A----- Swygert	Slight-----	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, erodes easily.	Percs slowly, erodes easily.
91B2----- Swygert	Moderate: slope.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly, erodes easily.	Percs slowly, erodes easily.
102----- La Hogue	Severe: seepage.	Severe: cutbanks cave.	Frost action--	Wetness-----	Wetness-----	Wetness.
103----- Houghton	Severe: seepage.	Severe: slow refill.	Frost action, subsides, ponding.	Soil blowing, ponding.	Ponding, soil blowing.	Wetness.
107----- Sawmill	Moderate: seepage.	Moderate: slow refill.	Flooding, frost action.	Wetness, flooding.	Wetness-----	Wetness.
125----- Selma	Severe: seepage.	Severe: cutbanks cave.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
134A----- Camden	Moderate: seepage.	Severe: no water.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
146A----- Elliott	Slight-----	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
146B2----- Elliott	Moderate: slope.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.
147A----- Clarence	Slight-----	Severe: no water.	Percs slowly--	Wetness-----	Wetness, percs slowly.	Wetness, rooting depth, erodes easily.
147B2----- Clarence	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Wetness, droughty, slow intake.	Wetness, percs slowly.	Wetness, rooting depth.
148B----- Proctor	Severe: seepage.	Severe: no water.	Deep to water	Slope-----	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
149----- Brenton	Moderate: seepage.	Severe: cutbanks cave.	Frost action---	Wetness-----	Wetness-----	Wetness.
150B----- Onarga	Severe: seepage.	Severe: no water.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
151----- Ridgeville	Moderate: seepage.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
152----- Drummer	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
153----- Pella	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
189----- Martinton	Slight-----	Severe: slow refill.	Frost action---	Wetness-----	Erodes easily, wetness.	Wetness, erodes easily.
192----- Del Rey	Slight-----	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
194B----- Morley	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
223B2----- Varna	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
230----- Rowe	Slight-----	Severe: slow refill.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
232----- Ashkum	Slight-----	Severe: slow refill.	Ponding, frost action.	Ponding, rooting depth.	Ponding-----	Wetness, rooting depth.
235----- Bryce	Slight-----	Severe: slow refill.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
238----- Rantoul	Slight-----	Severe: no water.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
241C----- Chatsworth	Moderate: slope.	Severe: no water.	Deep to water	Droughty, slow intake, percs slowly.	Percs slowly---	Droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
440B----- Jasper	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope-----	Favorable-----	Favorable.
481A----- Raub	Slight-----	Severe: slow refill.	Frost action--	Wetness-----	Erodes easily, wetness.	Wetness, erodes easily.
495C3----- Corwin	Moderate: seepage, slope.	Severe: slow refill.	Slope-----	Wetness, rooting depth, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
805. Orthents						
865*. Pits						

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol &lt; means less than; &gt; means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
23A----- Blount	0-12	Silt loam-----	CL	A-6, A-4	0-5	95-100	95-100	90-100	80-95	25-40	8-20
	12-33	Silty clay loam, silty clay, clay loam.	CH, CL	A-7, A-6	0-5	95-100	90-100	80-90	75-85	35-60	15-35
	33-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	90-100	90-100	80-100	70-90	30-45	10-25
56B----- Dana	0-19	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	85-95	30-35	8-12
	19-29	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-98	35-60	20-32

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In										
107----- Sawmill	0-14	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	14-29	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	29-48	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	48-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
125----- Selma	0-21	Loam-----	CL	A-4, A-6	0	100	98-100	80-100	55-85	25-35	7-17
	21-46	Sandy loam, loam, clay loam.	CL, SC	A-6	0	100	95-100	80-95	38-85	24-36	11-19
	46-60	Stratified sandy loam to silt loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	90-100	85-100	60-90	30-70	15-35	5-20
134A----- Camden	0-13	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	13-38	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	90-100	25-40	15-25
	38-56	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0-5	90-100	80-100	60-100	30-70	20-40	3-15
	56-60	Stratified gravelly sandy loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0-5	90-100	80-100	50-80	20-60	<25	3-10
146A----- Elliott	0-8	Silt loam-----	CL	A-6, A-4	0	95-100	95-100	95-100	75-100	30-40	8-18
	8-38	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	38-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
146B2----- Elliott	0-6	Silt loam-----	CL	A-6, A-4	0	95-100	95-100	95-100	75-100	30-40	8-18
	6-26	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	26-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
147A----- Clarence	0-11	Silty clay loam	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	15-25
	11-34	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	34-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	95-100	90-100	85-100	45-65	25-40
147B2----- Clarence	0-9	Silty clay-----	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	25-35
	9-26	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	26-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	95-100	90-100	85-100	45-65	25-40
148B----- Proctor	0-15	Silt loam-----	CL	A-6	0	100	100	95-100	85-100	25-40	10-22
	15-33	Silty clay loam	CL	A-7, A-6	0	95-100	90-100	85-100	85-100	25-50	10-25
	33-41	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	90-100	85-100	75-100	65-80	25-45	10-25
	41-60	Stratified silt loam to loamy sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
149----- Brenton	0-14	Silt loam-----	CL, ML	A-6, A-4	0	100	95-100	95-100	85-100	30-40	8-15
	14-34	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	100	95-100	95-100	85-100	35-50	10-25
	34-48	Clay loam, gravelly clay loam, silt loam.	CL	A-6, A-7	0	100	85-100	90-100	75-95	30-45	10-20
	48-60	Stratified gravelly sandy loam to silt loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	0	95-100	85-100	80-100	30-85	20-35	5-20
150B----- Onarga	0-10	Fine sandy loam	SC, SM, SM-SC	A-4, A-6, A-2	0	100	100	75-95	25-50	<28	NP-12
	10-29	Loam, sandy loam, fine sandy loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	75-95	30-60	19-32	5-14
	29-60	Stratified fine sand to fine sandy loam.	SM, SP-SM, SM-SC	A-2, A-4	0	85-100	80-100	70-95	12-50	<20	NP-6
151----- Ridgeville	0-12	Fine sandy loam	SC, SM, SM-SC	A-2, A-4, A-6	0	100	100	90-100	18-50	10-29	NP-12
	12-25	Very fine sandy loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-4, A-6	0	95-100	95-100	75-95	36-60	20-34	5-14
	25-60	Stratified sand to sandy loam.	SM, SM-SC, SC, SP-SM	A-2, A-4	0	90-100	90-100	70-98	12-50	<20	NP-8
152----- Drummer	0-16	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	16-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	44-55	Loam, silt loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	60-85	30-50	15-30
	55-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
153----- Pella	0-12	Silty clay loam	CL	A-7	0	100	95-100	90-100	85-95	40-50	15-25
	12-33	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	30-50	15-30
	33-42	Silt loam, loam, sandy loam.	CL	A-6, A-7	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	42-60	Stratified sandy loam to silty clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0-5	90-100	80-100	50-100	30-85	20-35	7-20
189----- Martinton	0-10	Silt loam-----	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	10-51	Silty clay loam, silty clay.	CL	A-7, A-6	0	95-100	95-100	90-100	70-95	35-50	20-30
	51-60	Stratified sandy loam to silty clay.	CL, SC	A-6, A-7	0	90-100	80-100	75-100	35-90	25-45	10-25
192----- Del Rey	0-14	Silt loam-----	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	25-45	10-25
	14-52	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	85-95	40-55	20-30
	52-60	Silt loam, silty clay loam, silty clay.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	10-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
194B----- Morley	0-11	Silt loam-----	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	75-95	25-40	5-15
	11-16	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-50	15-30
	16-29	Silty clay, silty clay loam, clay.	CL, CH	A-7	0-10	95-100	90-100	85-95	80-90	40-60	15-35
	29-40	Silty clay loam, clay loam, silty clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-60	15-35
	40-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-50	15-30
223B2----- Varna	0-12	Silt loam-----	CL	A-6, A-4	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	12-27	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	85-100	85-98	80-98	35-56	15-29
	27-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	85-100	85-98	80-95	30-45	13-26
230----- Rowe	0-14	Silty clay loam	CL, CH	A-6, A-7	0	100	95-100	90-100	85-95	35-60	15-35
	14-52	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-70	30-45
	52-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	90-100	90-100	75-95	45-60	20-35
232----- Ashkum	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	75-100	40-60	20-35
	15-41	Silty clay loam, silty clay.	CL, CH	A-7	0	100	90-100	85-100	75-100	45-65	20-35
	41-60	Silty clay loam, silty clay.	CL	A-7, A-6	0-5	95-100	85-100	80-100	75-95	35-50	15-30
235----- Bryce	0-12	Silty clay loam	CH, CL	A-7	0	100	100	95-100	85-95	45-60	20-30
	12-43	Silty clay, clay	CH	A-7	0-5	95-100	95-100	95-100	75-95	50-60	25-35
	43-60	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-5	95-100	90-100	90-100	75-95	40-65	20-40
238----- Rantoul	0-13	Silty clay-----	CH, CL	A-7	0	95-100	95-100	90-100	90-100	40-60	18-30
	13-38	Silty clay, clay	CH, CL, MH, ML	A-7	0	95-100	90-100	90-100	85-100	45-70	20-35
	38-60	Silty clay loam, silty clay, clay.	CH, CL, MH, ML	A-6, A-7	0-5	95-100	90-100	90-100	85-100	35-75	18-40
241C----- Chatsworth	0-5	Silty clay-----	CH	A-7	0	100	100	95-100	90-100	50-65	25-35
	5-18	Silty clay, silty clay loam.	CH, CL	A-7	0	100	95-100	95-100	90-100	45-75	20-45
	18-60	Silty clay, silty clay loam.	CL, CH	A-7	0	100	95-100	90-100	85-95	45-65	20-35
294B----- Symerton	0-11	Silt loam-----	CL	A-7, A-6	0	100	100	95-100	90-100	30-45	10-20
	11-33	Gravelly clay loam, loam, clay loam.	CL	A-7, A-6	0-10	95-100	75-95	75-90	60-90	35-45	15-25
	33-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-5	95-100	90-100	85-95	80-95	25-45	15-25
330----- Peotone	0-13	Silty clay loam	CH, CL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	13-41	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	41-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
375E----- Rutland	0-16	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	90-100	30-40	8-15
	16-41	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-55	15-35
	41-60	Silty clay, clay	CH, CL	A-7	0	100	100	95-100	85-100	40-60	20-35
405----- Zook	0-25	Silty clay loam	CH, CL	A-7	0	100	100	95-100	95-100	45-65	20-35
	25-60	Silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	95-100	60-85	35-55
440B----- Jasper	0-15	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	15-20	Loam, fine sandy loam, loam.	CL	A-6	0	100	100	85-95	60-75	20-35	10-20
	20-29	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	100	95-100	80-95	45-85	20-35	10-20
	29-52	Sandy loam, loam, clay loam.	SC, SM-SC	A-4, A-2-4	0	100	85-100	60-70	30-40	20-30	5-10
	52-60	Stratified silt loam to sand.	SC, CL-ML, CL, SM-SC	A-4	0	100	85-100	75-90	35-85	<30	5-10
481A----- Raub	0-10	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-95	25-35	5-15
	10-36	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	80-95	35-55	20-35
	36-45	Clay loam, silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	90-100	85-95	60-85	35-50	15-25
	45-60	Loam, clay loam	CL, ML, SC, SM	A-4, A-6	0-5	85-95	80-90	70-85	40-65	15-30	NP-15
495C3----- Corwin	0-8	Clay loam-----	CL	A-6	0	90-100	90-100	75-100	50-80	30-40	10-15
	8-37	Clay loam, loam, silt loam.	CL	A-6, A-4	0	90-100	90-100	75-100	50-80	30-40	9-15
	37-60	Loam, silt loam	CL, ML, CL-ML	A-4	0-3	90-95	85-95	75-85	50-75	<25	3-8
805. Orthents											
865*. Fits											

\*See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
23A----- Blount	0-12	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.43	3	6	2-3
	12-33	35-50	1.40-1.70	0.06-0.2	0.12-0.19	4.5-7.3	Moderate----	0.43			
	33-60	27-38	1.60-1.85	0.06-0.2	0.07-0.10	7.4-8.4	Moderate----	0.43			
56B----- Dana	0-19	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5	5	3-5
	19-29	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.0	Moderate----	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

[illegible]

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
235----- Bryce	0-12	35-40	1.30-1.50	0.2-0.6	0.12-0.21	5.6-7.8	High-----	0.28	5	4	5-7
	12-43	42-52	1.35-1.60	0.06-0.2	0.09-0.13	6.6-8.4	High-----	0.28			
	43-60	38-60	1.60-1.75	0.06-0.2	0.03-0.05	7.4-8.4	High-----	0.28			
238----- Rantoul	0-13	40-45	1.35-1.55	0.2-0.6	0.12-0.23	6.1-7.3	High-----	0.28	3	4	5-7
	13-38	42-60	1.45-1.65	<0.06	0.09-0.13	6.1-8.4	High-----	0.28			
	38-60	35-45	1.50-1.70	<0.06	0.08-0.20	7.4-8.4	High-----	0.28			
241C----- Chatsworth	0-5	40-60	1.30-1.50	<0.06	0.06-0.07	5.6-8.4	Moderate-----	0.32	2	4	.5-1
	5-18	35-60	1.50-1.70	<0.06	0.05-0.07	6.1-8.4	Moderate-----	0.32			
	18-60	35-50	1.60-1.85	<0.06	0.04-0.06	7.4-8.4	Moderate-----	0.32			
294B----- Symerton	0-11	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low-----	0.32	4	6	3-4
	11-33	25-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.32			
	33-60	20-35	1.45-1.70	0.2-0.6	0.09-0.10	6.6-8.4	Moderate-----	0.43			
330----- Peotone	0-13	33-40	1.20-1.40	0.2-0.6	0.12-0.23	5.6-7.8	High-----	0.28	5	4	5-7
	13-41	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High-----	0.28			
	41-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High-----	0.28			
375B----- Rutland	0-16	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	16-41	35-45	1.35-1.55	0.2-0.6	0.18-0.20	5.1-8.4	High-----	0.43			
	41-60	40-50	1.45-1.70	0.06-0.2	0.08-0.12	6.6-8.4	High-----	0.32			
405----- Zook	0-25	32-38	1.30-1.35	0.2-0.6	0.21-0.23	5.6-7.3	High-----	0.28	5	7	5-7
	25-60	36-45	1.30-1.45	0.06-0.2	0.11-0.13	5.6-7.8	High-----	0.28			
440B----- Jasper	0-15	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.28	5	5	3-5
	15-20	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low-----	0.28			
	20-29	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low-----	0.28			
	29-52	12-30	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low-----	0.28			
	52-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	6.6-8.4	Low-----	0.28			
481A----- Raub	0-10	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.28	5	5	2-4
	10-36	25-35	1.50-1.70	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	36-45	25-35	1.50-1.70	0.2-0.6	0.15-0.19	6.6-7.8	Moderate-----	0.37			
	45-60	20-32	1.50-1.70	0.2-0.6	0.05-0.19	7.4-8.4	Low-----	0.37			
495C3----- Corwin	0-8	27-35	1.40-1.60	0.6-2.0	0.17-0.19	5.1-7.3	Moderate-----	0.28	5	6	.5-3
	8-37	25-35	1.40-1.60	0.6-2.0	0.15-0.19	5.1-7.8	Moderate-----	0.28			
	37-60	10-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low-----	0.37			
805. Orthents											
865*. Pits											

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth Ft	Kind	Months		Uncoated steel	Concrete
23A----- Blount	C	None-----	---	---	1.0-3.0	Perched	Jan-May	High----	High----	High.
56B-----	B	None-----	---	---	3.0-6.0	Perched	Mar-Apr	High----	Moderate	Moderate.
67----- Harpster	B/D	None-----	---	---	+5-2.0	Apparent	Feb-Jun	High----	High----	Low.
69----- Milford	B/D	None-----	---	---	+5-2.0	Apparent	Mar-Jun	High----	High----	Low.
91A, 91B2----- Swygert	C	None-----	---	---	2.0-4.0	Perched	Feb-May	High----	High----	Low.
102----- La Hogue	B	None-----	---	---	1.0-3.0	Apparent	Feb-Jun	High----	High----	Moderate.
103----- Houghton	A/D	None-----	---	---	+1-1.0	Apparent	Sep-Jun	High----	High----	Low.
107----- Sawmill	B/D	Frequent---	Brief----	Mar-Jun	0-2.0	Apparent	Mar-Jun	High----	High----	Low.
125----- Selma	B/D	None-----	---	---	+5-2.0	Apparent	Mar-Jun	High----	High----	Low.
134A----- Camden	B	None-----	---	---	>6.0	---	---	High----	Low----	Moderate.
146A, 146B2----- Elliott	C	None-----	---	---	1.0-3.0	Apparent	Mar-May	High----	High----	Moderate.
147A, 147B2----- Clarence	D	None-----	---	---	1.0-3.0	Perched	Feb-May	Moderate	High----	Low.
148B----- Proctor	B	None-----	---	---	>6.0	---	---	High----	Moderate	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth Ft	Kind	Months		Uncoated steel	Concrete
192----- Del Rey	C	None-----	---	---	1.0-3.0	Apparent	Jan-May	High-----	High-----	Moderate.
194B----- Morley	C	None-----	---	---	3.0-6.0	Perched	Mar-May	Moderate	High-----	Moderate.
223B2----- Varna	C	None-----	---	---	3.0-6.0	Perched	Mar-May	High-----	Moderate	Moderate.
230----- Rowe	D	None-----	---	---	+5-1.0	Apparent	Mar-Jun	Moderate	High-----	Low.
232----- Ashkum	B/D	None-----	---	---	+1-2.0	Apparent	Apr-Jun	High-----	High-----	Moderate.
235----- Bryce	D	None-----	---	---	+1-1.0	Apparent	Feb-Jun	High-----	High-----	Low.
238----- Rantoul	D	None-----	---	---	+5-2.0	Perched	Mar-Jun	Moderate	High-----	Low.
241C----- Chatsworth	D	None-----	---	---	>6.0	---	---	Moderate	High-----	Low.
294B----- Symerton	B	None-----	---	---	3.5-6.0	Apparent	Mar-May	Moderate	High-----	Moderate.
330----- Peotone	B/D	None-----	---	---	+5-1.0	Apparent	Feb-Jul	High-----	High-----	Moderate.
375B----- Rutland	C	None-----	---	---	1.0-3.0	Apparent	Mar-May	High-----	High-----	Moderate.
405----- Zook	C/D	Frequent----	Brief-----	Feb-Nov	0-3.0	Apparent	Nov-May	High-----	High-----	Moderate.
440B----- Jasper	B	None-----	---	---	>6.0	---	---	Moderate	Moderate	High.
481A----- Raub	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Moderate.
495C3----- Corwin	B	None-----	---	---	2.0-4.0	Apparent	Jan-Apr	Moderate	High-----	Moderate.
805. Orthents										
865*. Pits										

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Ashkum-----	Fine, mixed, mesic Typic Haplaquolls
Blount-----	Fine, illitic, mesic Aeric Ochraqualfs
Brenton-----	Fine-silty, mixed, mesic Aquic Argiudolls
Bryce-----	Fine, mixed, mesic Typic Haplaquolls
Chatsworth-----	Fine, illitic, mesic Typic Eutrochrepts
Clarence-----	Fine, illitic, mesic Aquic Argiudolls
*Corwin-----	Fine-loamy, mixed, mesic Typic Argiudolls
Dana-----	Fine-silty, mixed, mesic Typic Argiudolls
Del Rey-----	Fine, illitic, mesic Aeric Ochraqualfs
Drummer-----	Fine-silty, mixed, mesic Typic Haplaquolls
Elliott-----	Fine, illitic, mesic Aquic Argiudolls
Harpster-----	Fine-silty, mesic Typic Calcicquolls
Houghton-----	Euic, mesic Typic Medisaprists
Jasper-----	Fine-loamy, mixed, mesic Typic Argiudolls
La Hogue-----	Fine-loamy, mixed, mesic Aquic Argiudolls
Martinton-----	Fine, illitic, mesic Aquic Argiudolls
Milford-----	Fine, mixed, mesic Typic Haplaquolls
Morley-----	Fine, illitic, mesic Typic Hapludalfs
Onarga-----	Coarse-loamy, mixed, mesic Typic Argiudolls
Orthents-----	Fine, mesic Udorthents
Pella-----	Fine-silty, mixed, mesic Typic Haplaquolls
Peotone-----	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Proctor-----	Fine-silty, mixed, mesic Typic Argiudolls
Ridgeville-----	Coarse-loamy, mixed, mesic Aquic Argiudolls
Rowe-----	Fine, mixed, mesic Typic Argiaquolls
Rutland-----	Fine, montmorillonitic, mesic Aquic Argiudolls
Sandwich-----	Fine-silty, mixed, mesic Cumulic Haplaquolls



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